SEP 13 1957

SEPTEMBER 195?
VOL. LII No. 9

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VETERINARY Medicine

Established 1905

features in this issue...

Indiana Veterinary Medical Association, 73rd Annual Convention

Teat Surgery

Differential Diagnosis and Treatment of Hog Cholera, Acute Erysipelas, and Acute Salmonellosis

Cesarean Section in Cattle

New Developments in Animal Nutrition

A Practitioner's Approach to the Ketosis Problem

Skin Manifestations of Internal Disorders

Induction of General Anesthesia in Small Animals

Clinical Problems in Small Animal Practice

Diseases of the Orbit

(Complete Index on Page VIII)

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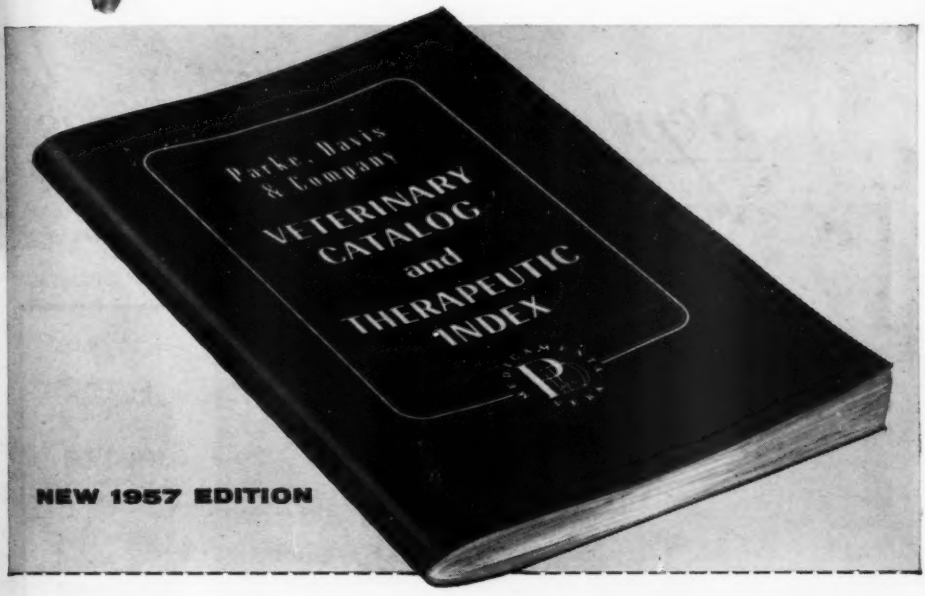

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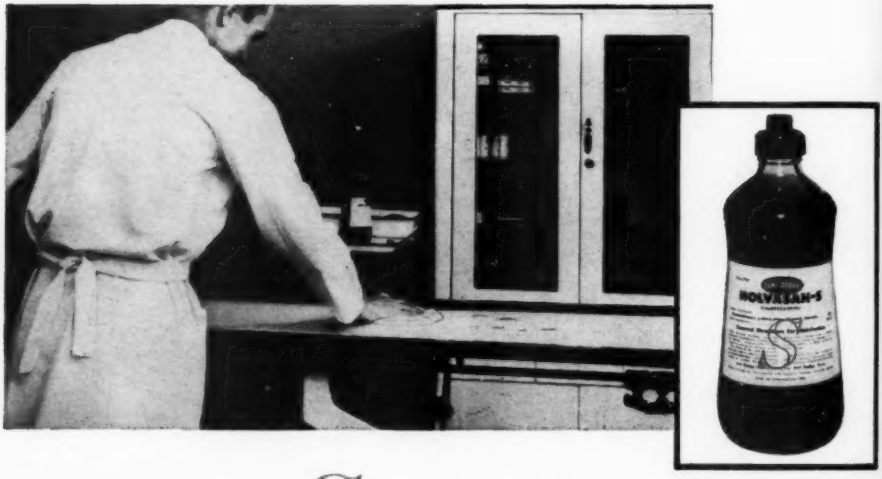

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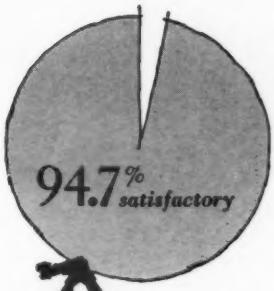

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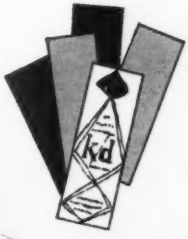

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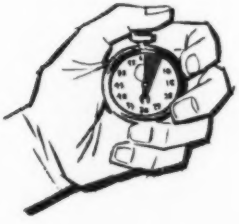

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NEWS COMMENT

Rainfall and Parasitism

Meteorological extremes that have been and are harassing most parts of the country during the past spring and current summer will inevitably cause marked changes in the geographic patterns and expectancies of parasitism. Heavy rainfall in the central and southwestern states will undoubtedly lead to outbreaks of parasitism by gastrointestinal nematodes, and such outbreaks could be of unprecedented proportions for those areas. The arid East should suffer less this year on account of parasitism than is usually the case, but any gain in this respect will almost certainly be offset by impoverishment of pastures.

With parasitic nematodes, the sensitive adjustment to climatic conditions makes it almost axiomatic that a favorable combination of rainfall, warmth, and cloudiness can not but lead to trouble. As Gordon points out, this aspect of parasite epizootology is basically a matter of population dynamics. The effect of these factors is to increase the population of infective organisms in already infected, susceptible populations of livestock.

There is a time-lag between periods of rainfall and insidious exacerbations of parasitic disease. From a technical standpoint, it would be desirable to anticipate outbreaks by employing therapeutic doses of phenothiazine in heavily stocked areas and by instituting a program of alternate therapeutic doses of phenothiazine and copper-nicotine drench, at something like three-week intervals, as soon as any evidence of parasitism is detected in a flock or herd.

The best management in individual outbreaks will depend upon the resourcefulness of the attending veterinarian, but he should be alert to the extreme hazard from parasitism that has been created by excessive rainfall.

—A. O. Foster, Sc.D.

VETERINARY Medicine
Established 1905

Registered in U. S. Patent Office

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In This Issue . . .

General Practice . . .

Indiana Veterinary Medical Association, 73rd Annual Convention Indianapolis, Ind., Jan. 16-18, 1957 415
Teat Surgery—J. P. Arnold and A. F. Weber 417
Differential Diagnosis and Treatment of Hog Cholera, Acute Erysipelas, and Acute Salmonellosis—Lee T. Railsback 427
Cesarean Section in Cattle—J. P. Arnold and E. A. Usenik 433
New Developments in Animal Nutrition—C. F. Chappel 453
A Practitioner's Approach to the Ketosis Problem—Chester E. Harries 458
Large Animal Parasitology in Veterinary Practice—A. C. Todd 459

Small Animal Practice . . .

Skin Manifestations of Internal Disorders—F. Kral 437
Heartworms in the Midwest—R. M. Stone 441
A Safer Technic for the Induction of General Anesthesia in Small Animals—Leonard Krawitz 442
Some Clinical Problems in Small Animal Practice—J. E. Mosier 445
Diseases of the Orbit—W. G. Magrane 449

Editorial Comment . . .

Penicillin Sensitivity 426
Genus Microplasma 426
Vitamin D Poisoning 426
Accurate Rumen Function Studies Made Posibie by New Technics 432
Tularemia 441
Interference Phenomenon of Rabies Antiserum and Vaccine 444
Minnesota Brucella Free 457
D. C. Academy Organized 457
Iowa State Homecoming Luncheon 457
Sale of Hog Cholera Virus Restricted in 16 States 459
Anthrax Outbreak in Oklahoma 461
Fats Wrongly Condemned 461
Dean Armistead to Michigan State University 462
Public Health Service Research Grant and Fellowship Programs Which Apply to Veterinary Medicine 462
Rewards of Garbage Cooking Restrictions 463
Lt. Col. T. C. Jones now Pathologist at Angell Memorial Animal Hospital 463
Doctor Simms Accepts Assignment in Turkey XXXVII
CIBA Launches Promotion Campaign XLI
Gaines Veterinary Symposium XLI
Wyeth Laboratories Names Drs. McCarty and Huebner to Veterinary Posts XLIV
Doctor Adams to Teach and Study in Africa XLVII
Clinic—Clifford L. McGinnis 452
Principles of Animal Health—R. R. Dykstra 464
Poultry Practice Problems—W. R. Hinshaw 465
The Practitioner's Laboratory—William L. Sippel 466
Book Reviews
The Status of Animals in the Christian Religion 468
The Infectious Diseases of Domestic Animals 468
Meeting Calendar LVII
Necrology LVIII

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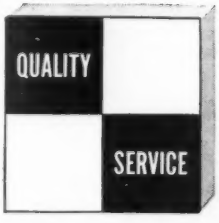

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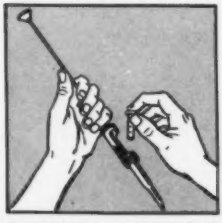

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*R. J. Deans, W. J. Van Arsdell, E. F. Reineke and L. J. Bratzler (Michigan Agricultural Experiment Station): The Effect of Progesterone-Estradiol Implants and Stilbestrol Feeding on Feed Lot Performance and Carcass Characteristics of Steers. Journ. Animal Sci. 15:1020, 1956.

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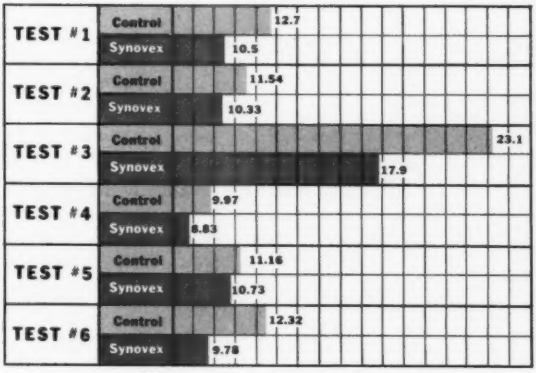
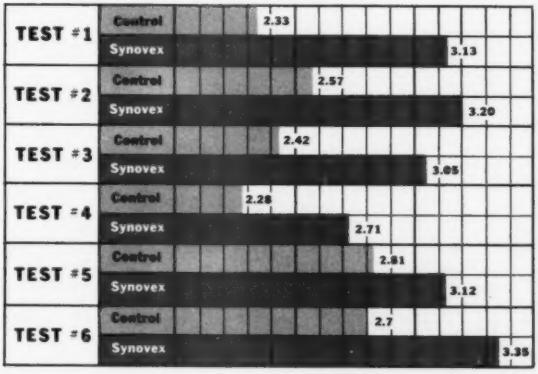


Gain per head per day



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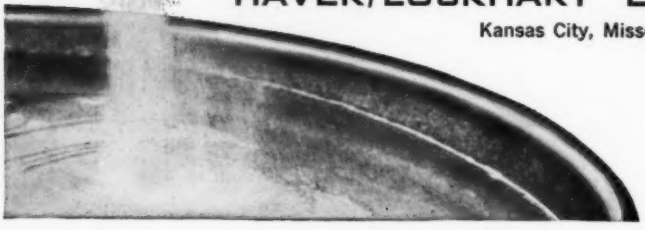

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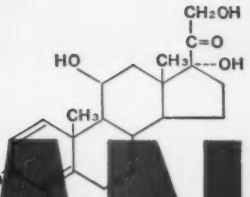

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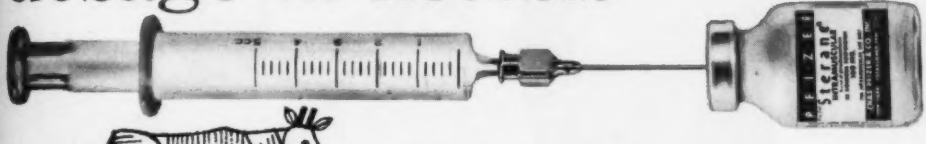

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*Link, R. P.; Newton, D. I., and Huber, W. G.: The Use of Prednisolone in Bovine Ketosis, paper presented at the 93rd Annual Meeting, A.V.M.A., San Antonio, Texas, Oct. 15-18, 1956.

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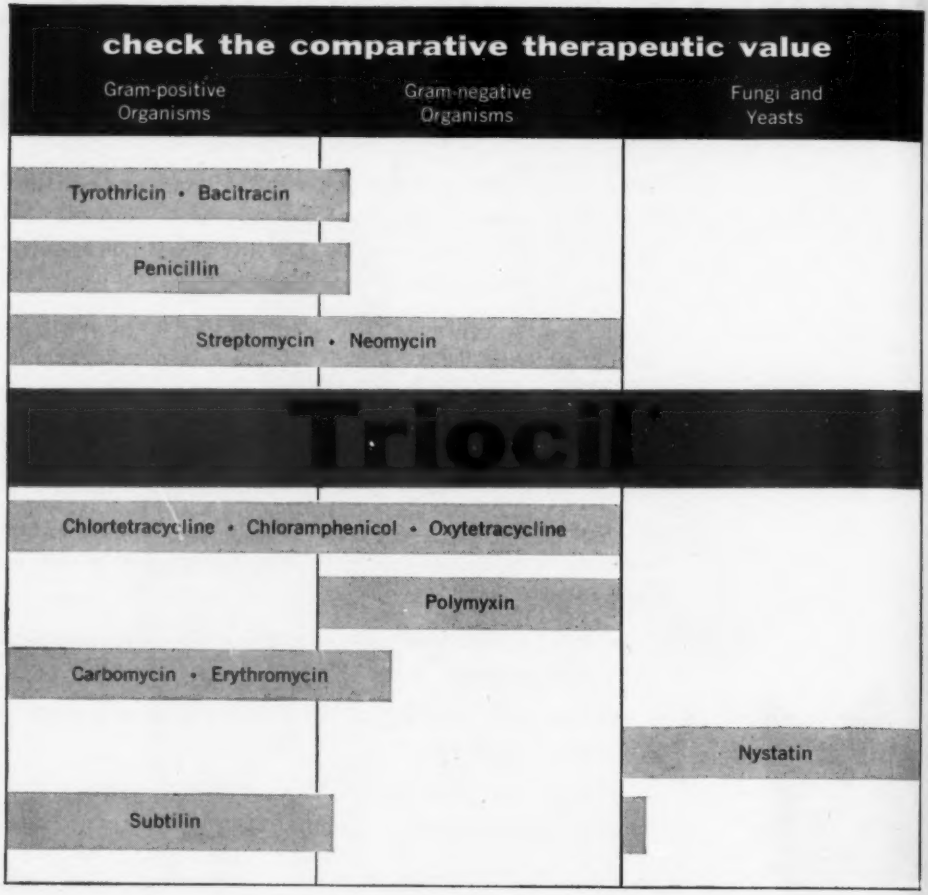

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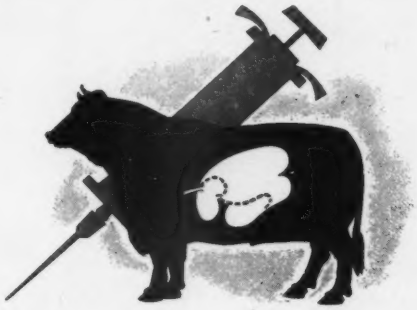
LIVESTOCK PARASITE PROBLEM IS SERIOUS—EVEN IN NORTHERN STATES



Here's one answer to the problem:

New 3-Step Program for Control of Internal Parasites in Livestock

More and more research indicates that even long, cold winters do not kill internal parasites in livestock. From Vermont, for example, a report* shows the discovery of acute submaxillary edema in a herd of heifers just put on pasture. Later autopsy revealed extreme parasitic infestation of Haemonchus Contortus. Similar conditions are recorded by veterinarians in every northern state. Yet *few farmers realize the seriousness of the worm problem.*

To impress farmers with the importance of having animals—even when apparently healthy—checked and treated for internal parasites, International Salt Company is backing a new "3-step program" for internal-parasite control. The first two steps of this program promote regular veterinary consultation.

STEP ONE: Constant herd supervision by a veterinarian, so that parasitic infestations and other diseases can be prevented by early treatment.

STEP TWO: Therapeutic phenothiazine treatment by a veterinarian at least twice a year—when livestock go on pasture, and when they come off.

STEP THREE: Daily low-level feeding of phenothiazine in salt (the ideal natural carrier) to maintain constant suppression of viable eggs.

This important program is being promoted to farmers, feed mixers, manufacturers and dealers everywhere. In this promotion, we are showing how the veterinarian plays a vital role in helping cattle producers, dairymen, and sheepmen make more profits.

For step three of the program, the product that is gaining acceptance everywhere is Sterling Green'salt—a special development of the International Salt Company. A trace-mineral salt with 10% phenothiazine added, Sterling Green'salt can be fed free-choice or mixed in feed. In either case, it has proved effective in controlling certain internal parasites in sheep and cattle. International has solved the phenothiazine-palatability problem by adding an exclusive new flavor ingredient, Sucarob, to Green'salt. As a result, animals will eat as much of this salt product as they need—every day.

Service—from International's Animal Nutrition Department. If you'd like more data on Sterling Green'salt, or information on the use of salt and trace minerals in modern livestock and poultry feeding programs—contact International's Animal Nutrition Department at Watkins Glen, N.Y. This department does continuing research into the proper feeding of salt and trace minerals . . . works with veterinarians, farm advisers, feed mixers and manufacturers . . . and coordinates advanced test programs with leading colleges and experiment stations. We will be glad to cooperate with you in any way.

**Report on herd of M. D. Bibens, West Rupert, Vermont*

STERLING GREEN'SALT SALT + 10% PHENO + TRACE MINERALS

Product of INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

Nothing succeeds like

...success

This age-old French proverb accurately describes the increased acceptance of Diamond Laboratories porcine origin, modified live virus hog cholera vaccine. The high percentage of 1956-57 sales indicate that veterinarians are using more and more Diamond Laboratories Vaccine every day.

Added care and precautions in the production of Diamond Laboratories Vaccine is largely responsible for the outstanding performance delivered in the vaccination of millions of swine.

A standard dose (2cc with 10cc serum) produces solid immunity and erases the possibility of spreading hog cholera. Diamond Laboratories Vaccine is made available in 2-5-10-20 and 50 dose vials.

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tranquility
with
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without
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(pronounced Trill' ah-fon) perphenazine
VETERINARY

a true
therapeutic
restraint

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PHYSICAL
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Trilafon

for intractable animals..

tranquility with alertness

control without force

greater effectiveness

TRILAFON controls manifestations of anxiety, fear, n
or viciousness. It enjoys a favorable therapeutic rati
which means markedly lower dosages at a range sub
of side effects produced by other phenothiazine drug

higher potency

TRILAFON has been found five to six times more
active in its behavioral effects than chlorpromazine
corresponding increase in autonomic effects, blood c
function abnormalities.

increased safety

Laboratory studies in dogs indicate that TRILAFON h
index approximately 17 times that of chlorpromazin

versatility

TRILAFON is available for oral or parenteral use in st
and for intravenous or intramuscular use in large an

unexcelled antiemetic

TRILAFON controls nausea and vomiting at a fraction
dosage required by other phenothiazine derivatives.
antiemetic is comparable to that of its behavioral ef

in small animals

TRILAFON quiets unruly, restless or excited animals d
examination or therapy and eases handling in accide
cosmetic, minor surgical and postoperative procedur
can be used safely in conjunction with local anesthe
section and as a preanesthetic agent (reduces anesth
much as one-third) . . . antiemetic effect controls vo
associated with worming medication.

in large animals

TRILAFON is useful in dehorning, teat and other min
training of first-calf heifers to stanchions and milkin
replacement of prolapsed uterus or vagina . . . with a
anesthesia for cesarean section, rumenotomy, laparo
digital amputation, removal of cancerous eye and ur
. . . in quieting belligerent or nervous animals durin
procedures such as trimming hooves, examining teet

ty, fear, nervousness
eutic ratio, an advantage
range substantially free
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romazine without a
s, blood or liver

RILAFON has a therapeutic
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l use in small animals
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animals during
in accident cases,
procedures . . .
al anesthetics for cesarean
es anesthetic dosage by as
ontrols vomiting often

other minor surgery . . .
nd milking machines . . .
. . . with appropriate local
y, laparotomy, dystocia,
eye and urinary calculi
nals during routine
ining teeth, etc.

TRILAFON Dosage Guide

Animal	Oral	Intravenous	Intramuscular
DOG	4 mg./10 lb. b.i.d.	5 mg./20 lb.	5 mg./20 lb.
SWINE			10 mg./100 lb.
ADULT BOVINE		75-125 mg.	100-150 mg.
CALVES & HEIFERS		Adjust adult dosage according to body weight and degree of tranquilization required.	

Dosage should be adjusted to the size of the animal and degree of tranquilization required.

onset of effect

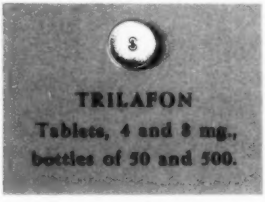
In **dogs**, when administered as recommended, TRILAFON Tablets are effective in 45 minutes to one hour. TRILAFON Injection, intramuscularly, is effective in 20 to 30 minutes and intravenously in 10 to 20 minutes.

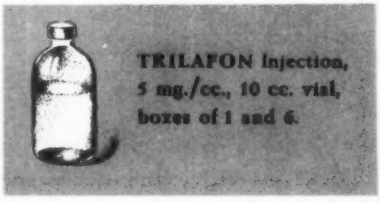
In **swine** and the **bovine** TRILAFON Injection is effective intramuscularly in 30 to 45 minutes, and intravenously in 10 to 15 minutes.

Duration of action depends upon the species, size, temperament and dose administered. Effects may last 6 hours or longer.

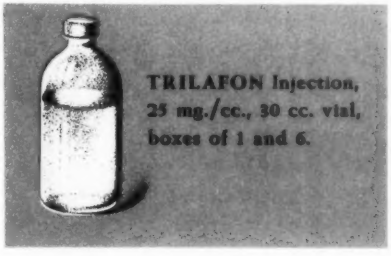
Packaging

SMALL ANIMALS





LARGE ANIMALS



PRECAUTION

TRILAFON is contraindicated in all depressed conditions. **It also must be considered contraindicated in the horse until further clinical investigation has developed a safe, effective dosage range for this species.**

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investigators report preference

METICORTEN

aqueous suspension

VETERINARY

shortens treatment time

in chronic summer eczemas

and allergic dermatoses

"the first forward step in positive relief for the patient that we have had in 30 years of practice."[1]

METICORTEN represents " . . . another great advance in veterinary medicine similar to that of the antibiotics."[2]

- promptly effects remission of symptoms
- assures almost immediate relief from inflammatory reactions
- markedly reduces or eliminates intense itching
- prevents chewing and self-mutilation
- improves appetite and sense of well-being

DOSAGE FORMS FOR SMALL ANIMALS

METICORTEN Aqueous Suspension, 10 mg./cc., 10 cc. vial, boxes of 1, 6, 72.
METICORTEN Tablets, 2.5 and 5 mg., bottles of 30 and 100.

1. ENGLE, J. B.
2. FISHER, L. E.

First Veterinary Symposium on the Uses of Meticorten and Meticortelone, New York, N. Y., Nov. 29-30, 1956.

METICORTEN,® brand of prednisone.
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*T. M. V-TR-J-157

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SCHERING CORPORATION
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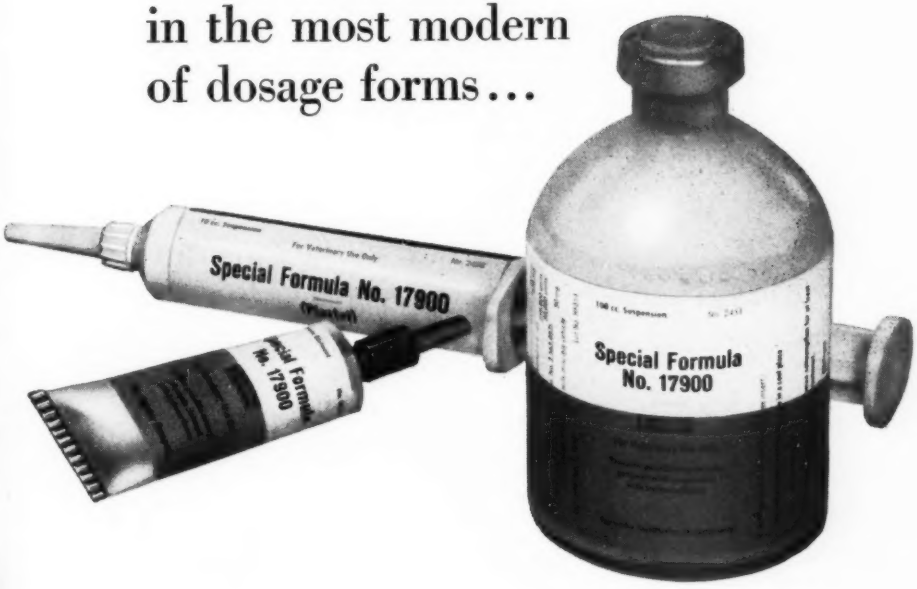
The most modern in mastitis formulas in the most modern of dosage forms...



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the formula **Neomycin**
Penicillin
Polymyxin
Powerful antibiotic combination effective against all the organisms commonly associated with mastitis.

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Powerful anti-inflammatory action to reduce swelling and fibrosis, and thereby preserve immediate and future milk production.

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Special Formula No. 17900 is available only to veterinarians

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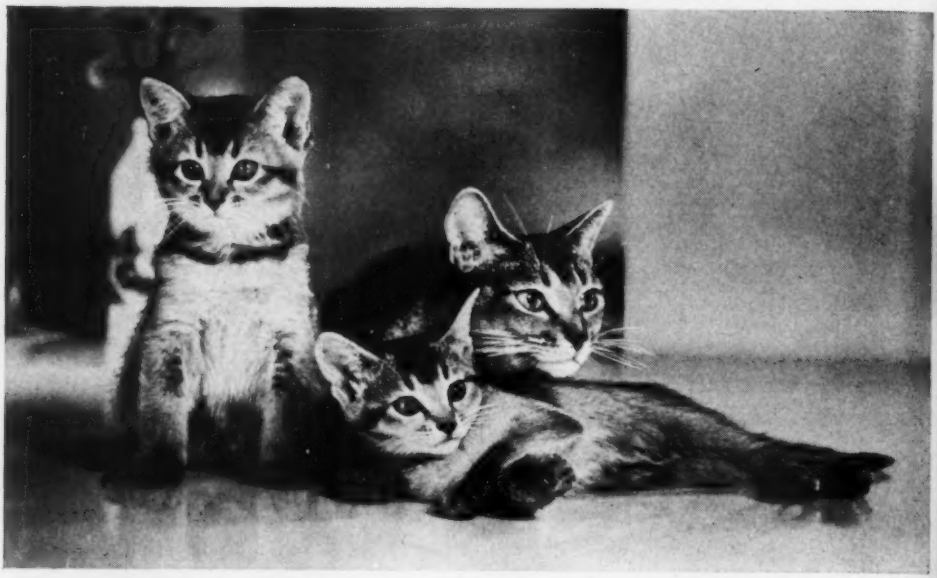

"So sleek and sweet-natured"

The above quotation, from an unsolicited letter, is a typical layman's reaction to the striking effect of a regular Puss 'n Boots diet upon a cat's appearance and disposition. Such expression, of course, merely confirms the fact — already known to you — that good nutrition brings quickly perceptible results.

Whole Fish, Cereals, Vitamins

Puss 'n Boots includes the whole fish, not mere fish "frames" or by-products . . . the costly fillets with their high quality proteins . . . the liver with its rich supply of vitamins, the glands with their valuable minerals . . . even the bone structure, properly processed, for phosphorus and calcium.

Selected cereals are added to the finely ground whole fish for carbohydrates and roughage. And extra Vitamin B_1 is added to every can as a therapeutic "margin of safety".

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You can recommend this carefully balanced diet to your cat-owning clientele with utmost confidence. They will see its positive nutritional benefits — quickly. Puss 'n Boots is sold at food and pet stores everywhere, in two handy sizes.

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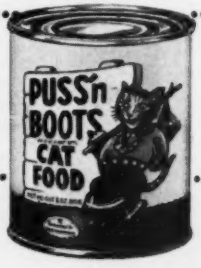

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Available in 8 oz. and 15 oz. sizes.

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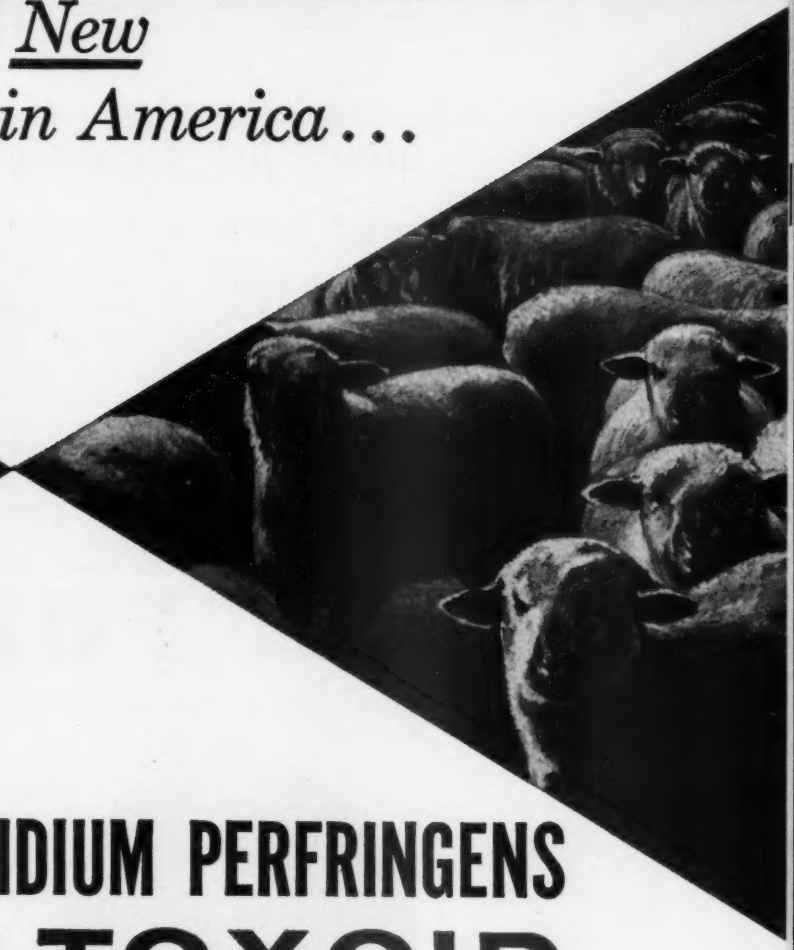

CLOSTRIDIUM PERFRINGENS TYPE D TOXOID

...an improved immunizing agent...

protects sheep and lambs against enterotoxemia during entire usual feeding period.*

Thousands of lambs need protection against enterotoxemia* during the feeding season. In its continuing program of research, Affiliated Laboratories has evolved improved processing techniques in the development of its new Clostridium Perfringens Type D TOXOID. These techniques have produced a stable, highly potent, more effective immunizing agent against enterotoxemia*.

This new Toxoid stimulates a much higher average and more lasting antitoxin titer in lambs (and sheep) than results from the use of bacterin. It establishes immunity within 10 days that persists for the usual feeding period.

A potency test is conducted on each serial using lambs as test animals. In addition appropriate biological and bacteriological tests **insure** the potency, purity, safety and sterility of the toxoid.

*(Caused by Clostridium Perfringens Type D toxin)

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The National Laboratories Corp. **Grain Belt Supply Co.**
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PRODUCED FOR AND SOLD TO GRADUATE VETERINARIANS ONLY

new "far superior" treatment for retained placenta

Therapeutic failure, frequently encountered in retained placenta, can be prevented—with new FUREA Veterinary which combines the potent wide-range bactericidal and deodorizing action of FURACIN* (brand of nitrofurazone) with the cleansing action of urea. FUREA Veterinary boluses disintegrate readily and are nonirritating and nontoxic.

In retained placenta, treatment with FUREA has produced quick improvement of the general condition of the cow with lessening or elimination of malodor. Fertility rate remained unimpaired in over 90% of treated cows.*

SUPPLIED: Each bolus contains 0.12 grams of FURACIN and 12 grams urea. Bottle of 25.

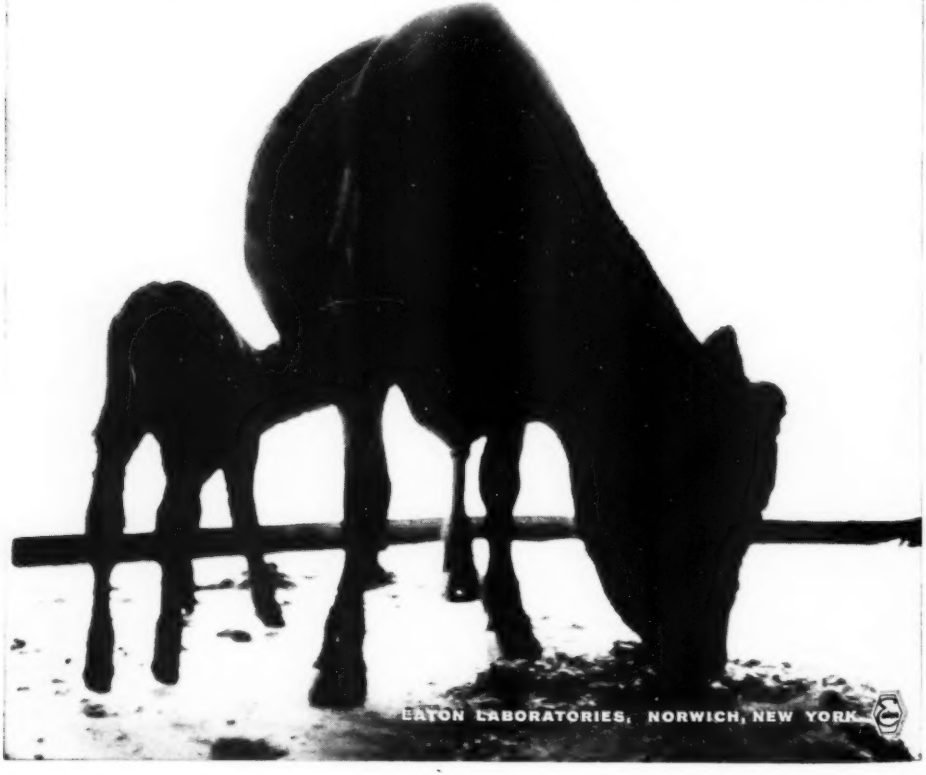
DOSE: Two boluses inserted into the recently pregnant horn. One bolus may be placed in the non-pregnant horn.

*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

For vaginal infections, including those caused by Vibrio fetus, that may prevent conception, or cause abortion, dispense: FURACIN Suppositories Veterinary, large. Box of 12.

FUREA™ VETERINARY

AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR



new specific treatment for calf scours

Developed specifically for the control of calf scours, new ENTEFUR provides rapid, effective and safe treatment. ENTEFUR drastically cuts mortality.[1,2] In one study, 60 of 63 ENTEFUR-treated calves survived, whereas in the control group only 3 of 24 calves lived.[2] "ENTEFUR treatment appeared the only factor modifying significantly the course and outcome of the disease."[2]

ENTEFUR contains the new nitrofuran, Furamazone® (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

ENTEFUR BOLUS VETERINARY, small, contains: Furamazone 1 Gm., bismuth subsalicylate 0.26 Gm. Dosage: 1 bolus twice a day for 2 days. Supplied: Box of 24 (6 envelopes of 4 boluses each).

REFERENCES: 1. Bull, W. S.: N. Amer. Vet., in press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., in press.

ENTEFUR™

NOW AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

EATON LABORATORIES, [illegible] **YORK**

infectious
bovine
rhinotracheitis
(IBR) vaccine

available now... to
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an original research
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RHIVAX*

(PATENT PENDING)

PITMAN-MOORE COMPANY
Division of
ALLIED LABORATORIES, INC.
INDIANAPOLIS 6, INDIANA

Indiana Veterinary Medical Association 73rd Annual Convention Indianapolis, Ind., Jan. 16-18, 1957

In this issue of VETERINARY MEDICINE is reported all of the available technical program presented at the 73rd annual meeting of the Indiana Veterinary Medical Association. The project has been made possible through the splendid cooperation of the group of speakers selected by the Program Committee for this meeting, and by President Dr. J. E. Jordan and other officers of the Indiana Association.

Members of this large, active, and influential group take pride in the excellence of their annual meetings, and the untiring efforts of successive Committees to develop programs that serve as postgraduate study on problems with which they are frequently confronted.

A desire to unselfishly share with all veterinarians technical material especially prepared for the Indiana meeting has prompted its publication in this issue.

Active endorsement of the membership of efforts by those placed in temporary authority is evident in the fact that attendence for this meeting approximated the total membership. Of the 346 paid-up members as of the date of the meeting, 248 were in attendance. Out of state registrations, those making application for membership, life members, and exhibitors brought the attendence figure to 361. The treasurer reported a sound financial position and some considerable savings were made possible during the past year under a newly instituted budget program.

Report of the State Veterinarian

In the course of his report, Dr. Joe Green, Indiana State Veterinarian, recalled that the state legislature in 1945 earmarked $125,000. for each year of the biennium for brucellosis eradication. This amount was increased to $250.000. annually for the 1947-48 biennium. At that time, the legislature provided for a study commission whose job it was to survey disease control laws and regulations then operative. The result was the Animal Disease Code of 1951 which now governs matters concerning animal health. Further, in reference to Brucella infection, Doctor Green indicated that 812,000 cattle were blood tested during the period from 1950 to 1956 revealing an infection rate of 1.8%. He estimated that this project alone has resulted in annual savings of more than $1,000,000. in Indiana. Practical eradication of brucellosis by Jan. 1, 1958 has been set by Indiana officials.

Dr. Raymond W. Worley, OSU '43, general practitioner located at South Bend, is president of the Indiana Veterinary Medical Association.

Report of Committee on Insurance

The Committee on Insurance reported a special study for evaluation of the insurance program adopted by the Association nine years ago. Two local independent insurance brokers engaged by the Association (without knowledge of each other's reports) both recommended the Silent Partner D.V.M. Plan, underwritten by the Continental Casualty Co. as the best disability insurance protection available to members. Chairman Dr. C. R. Baumgartner referred to the "home rule" feature of the present program and the completely satisfactory experience of the program as it enters its ninth year. Each Association member was advised of official approval of the Silent Partner-D.V.M. Plan and the names, addresses, and telephone numbers of all members of the Committee on Insurance were distributed in the event their services are needed in settling claims for accident or illness. The Committee

is established as permanent in the Association. Only one change has been made in its personnel during its nine years of existence.

Resolutions on Veterinary School for Indiana

The Committee on Resolutions expressed the consensus of members by proposing that although the Association has made persistent efforts to establish inter-university contracts for qualified Indiana residents to study veterinary medicine in established schools, they pledge support of any legislative action which might result in the establishment of a College of Veterinary Medicine at Purdue University. Included with the resolution was expression that the establishment of such a school must not interfere with continuation of the excellent research work now being pursued at the Purdue Department of Veterinary Science, but that the present Department be continued as a separate entity.

It was announced in July that the legislature has appropriated funds for the establishment of a veterinary school at Purdue and that the project will be completed at the earliest possible date.

Elections

Officers elected to serve for the coming year included Dr. R. W. Worley, South Bend, president; Dr. Russell Portman, Lafayette, president-elect; Dr. Leonard Clark, Bedford, vice-president. Dr. L. M. Borst, Indianapolis, was reelected secretary-treasurer.

Entertainment features were programmed for both the first and second meeting day. A mixer and square dance followed an evening program devoted to subjects of special interest to small animal practitioners the first day, and a banquet and dance following the President's Reception concluded the planned entertainment. Members of the Indiana Association like those elsewhere made the 2½ day meeting period enjoyable as well as profitable.

No one left the Indianapolis sessions this year, as far as this reporter is aware, without feeling considerably rewarded in one way or another for having taken the time and expended the necessary funds in order to meet and participate with others interested in advancing their professional information and proficiency.

▼ ▼ ▼

The returns of the successful Minnesota brucellosis campaign bring out the facts that human brucellosis in the state has declined from a reported 403 cases in 1939 to 63 for the past fiscal year.

In addition to the value of the campaign in terms of human health, dairymen and other cattlemen are estimated to have gained $35,000,000. over and above state costs of testing for qualification of Minnesota as the seventh state of the nation to attain the coveted modified certified brucellosis-free status.

Officers of the Indiana Veterinary Medical Association selected to serve for the year 1957. Left to right: Dr. Russell F. Portman, Lafayette, Pres.-elect; Dr. L. A. Clark, Bedford, Vice-President; Dr. R. W. Worley, South Bend, President; and Dr. L. W. Borst, Indianapolis, Secretary-Treasurer.

Surgery involving the teats of dairy cows is a specialized service to which impeccable technics must be applied to avoid unfavorable sequellae. If procedures are carelessly performed, little good is accomplished ordinarily; much harm is not only possible, but even disastrous results may follow.

In this carefully prepared treatise, the authors have detailed procedures for handling commonly referred problems. These range from classification of condition and preparation for surgery to methods for correction of congenital anomalies and repair of tissue frequently traumatized.

Teat Surgery†

J. P. ARNOLD,* D.V.M., M.S., Ph.D., A. F. WEBER,* D.V.M., M.S., Ph.D.,
St. Paul, Minnesota

SUCCESSFUL surgery of the bovine teat can save many valuable animals from being sent to slaughter or from losing one or more quarters. It can also be of value by increasing the ease with which milk can be removed from the teats. The ability to successfully perform teat surgery will help the veterinarian build and maintain a practice in dairy areas.

The purpose of this paper is to review briefly anatomy of the teat, describe some of the problems that are presented frequently, and describe methods of correction which have been successful.

Anatomy of the Bovine Teat

The shape of the teat varies from conical to cylindrical.[8,14,20] The distal end may be flattened or rounded.[3,14] The external opening is referred to as the teat orifice. A ridge around the teat orifice, which is 0.5 to 1.0 mm. high,[14] protrudes when milk is expressed. The papillary duct (streak canal, teat canal) illustrated in fig. 1, leads from the teat orifice internally to the teat sinus. The papillary duct averages about 1 cm. in length.[11,20] Circumference of the papillary duct varies throughout its length with the greatest diameter usually being at the proximal end while the smallest diameter is near the distal extremity.[8,16] The papillary duct is closed by a sphincter muscle which acts as a valve to prevent leakage. At the proximal end of the papillary duct or at the junction of the duct and the teat sinus is Fürstenberg's rosette.[11] This is usually composed of eight circular folds of tissue and Hug[14] described three to ten secondary folds on each primary fold. Jepsen[15] believed that the rosette aided in the expansion or the lower end of the teat sinus when milk is being expressed. Espe[7] and Pounden and Grossman[22] stated that the rosette aids in preventing milk from leaking through the duct. The teat sinus (cistern) has longitudinal, circular, and oblique folds in the mucosal layer which lines the wall.[8,14] The longitudinal folds originate in the papillary duct, pass dorsally through the rosette area and the

†Revision of a paper presented by the senior author at the annual meeting of the Indiana Veterinary Medical Association, Indianapolis, Jan. 16-18, 1957.

*From the Divisions of Veterinary Surgery and Radiology (Arnold) and Veterinary Anatomy (Weber), College of Veterinary Medicine, University of Minnesota.

teat sinus to end in the gland sinus.[9] Pockets may be formed[2] where the folds in the mucosal layer intersect each other. At the junction of the teat and gland sinuses there may be a circular fold.[2,20,28] Arnold[2] found these in about 5% of the teats examined and Rachow[23] in about 6%. In the intact teat, there is a natural narrowing in this area. Blood vessels located directly under the mucosal surface may form a small ridge which completely or incompletely encircles the sinus wall.[2,8,11,24] Arnold[2] found these in approximately 1% of the teats examined.

The epidermal portion of the skin covering the teat is composed of a highly cornified stratified squamous epithelium. This epithelium also extends throughout the papillary duct. It ends rather abruptly in the region of the rosette.[28]

According to Foust,[9] the papillary layer of the dermis is richly supplied with capillaries and nerves. Papillae of this layer may project into the epidermal layer so that only a few cells lie between them and the surface. This would explain the sensitivity of some teats and also the ease with which some teats hemorrhage when irritated. A reticular layer of the dermis, which is composed of coarse connective tissue interspersed with a few bundles of smooth muscle fibers, lies next to the papillary layer. Most of these smooth muscle fibers run in a longitudinal direction.[9]

The muscular layer is next and is composed of bundles of smooth muscle fibers and also collagenous fibers.[9] The muscle bundles in the external part of this layer run in a longitudinal direction while those in the interior tend to run in a circular direction. Riederer[24] stated that at the junction of the base of the teat and the udder muscle bundles form more than half of the teat wall. In the middle of the long axis of the teat the muscle bundles form the principal part of the teat wall. In the distal or lower part connective tissue fibers predominate. Foust[9] described a connective tissue layer between the muscle layer and the mucosa which lines the interior of the teat. He stated that this layer contained a large number of blood and lymph vessels and some nerves. Pounden and Grossman[22] found that this connective tissue layer adhered more closely to the muscular layer than to the mucosal layer and believed that it should be considered a separate layer. They suggested that it would be useful in suturing the wall of the teat. The lining epithelium of the mucosal layer is composed of two layers of cells. It extends from the teat sinus into the gland sinus and up the collecting ducts to the vicinity of the secretory lobular units of the udder.[29] This mucosal layer is not strong enough to hold sutures.

Venzke[29] described accessory teat glands of tubuloalveolar type in the connective tissue layer of the mucosa. Blackburn[4] called these "periductal" lobules and also found them in the gland sinus. Foust[9] found the connective tissue cells in this layer to be embryonal in type. This would make it easily stimulated to proliferate when irritated or traumatized.

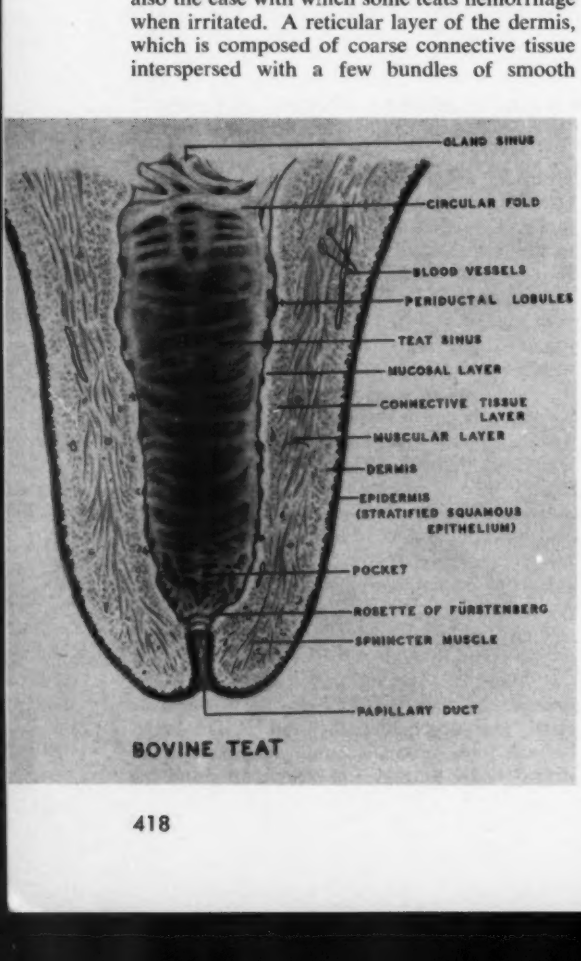

Fig. 1. Drawing illustrating structure of the bovine teat.

Restraint and Anesthesia

The type of restraint varies with surgical procedure and the disposition of the patient. For simple operations such as enlarging the papillary duct, the cow's head is secured with a halter or a pair of nose tongs and the so-called "tail hold" is applied. Another means of restraint which may be used on individuals more difficult to handle is to fasten a rope around the hind leg on the side of the affected

teat and pull the leg upward in the manner used by Trump and Parker.[25] This method has the advantage of moving the leg so that it does not interfere with vision of the operative field. For more extensive operations or for intractable animals it may be preferable to cast the patient and administer a sedative dose of chloral hydrate and magnesium sulfate solution intravenously.

Usually no anesthesia is necessary for simple operations such as enlarging the papillary duct in hard milkers since it is performed rather quickly. For other operations anesthesia is desirable. The teat may be anesthetized by infiltrating 2% procaine hydrochloride solution or 1% cyclaine®[1] solution around the base of the teat. A 22-gauge 1 in. needle is used. The wall of the teat is infiltrated down to and including the mucosal layer. Six to 8 ml. of anesthetic solution usually is required. If the mucosal layer is to be anesthetized, 2 or 4% butyn sulfate®[2] solution or metycaine®[3] is infused into the teat sinus.

Preparation of the Operative Field

The udder is brushed free of debris but not scrubbed with soap and water unless it has been shaved or closely clipped. If there is long hair on the udder, it can not be completely dried and droplets of water contaminated with organisms from hair follicles and skin glands will seep down onto the operative area. The teat is scrubbed with soap and water and dried. If the surface of the teat appears oily, it is defatted with ether. The last step in preparation is to paint the entire teat with mild tincture of iodine. Modifications for lacerated or contused teats will be described under those headings.

Lacerations and Contusions

Trauma of the teats of cattle may be in the form of lacerations received from barb wire, thorns, and occasionally from animal bites. Teats may also be stepped on and lacerated by sharp hoofs.

Trauma may also be in the form of contusions. These usually result from crushing when stepped on or pressed against the edge of the gutter. Case[5] concluded from his studies that 95% of these injuries were self-inflicted. Neusch[21] also concluded that most of the teat lesions were the result of self-inflicted traumatism. Cows frequently step on their front teats when rising and many cows with pendulous udders frequently step on the hind teats as well. The hind teats may also be contused by pressing the teat against the floor with the hock when rising as Neusch[21] suggested.

Lacerations which do not extend completely through the wall may be sutured if attended promptly after their occurrence. Those which are observed some hours after laceration may also be sutured if the wound edges are debrided. The material used for suturing should have no capillary action and should not be irritating to tissues. Some of the new synthetic suture materials are satisfactory for this purpose. Simple interrupted stitches are used and the suture line is covered with collodion or plastic dressing such as aeroderm.®[4] Some teats may be bandaged or taped to lessen tension on sutures. However, many teats are edematous when presented for treatment and are better treated as open wounds after the irregular edges have been trimmed. If a protective covering is desired, a strainer pad may be used.

Fig. 2. Illustrating a common type of trauma — laceration near papillary duct.

Lacerations near the papillary duct such as shown in fig. 2 are usually treated by cutting off the irregular part. If the duct is involved, a plastic teat tube with a removable cap* is inserted and left in place for a few days.

®[1]Merck Sharp and Dohme, Inc., Philadelphia, Pa.
®[2]Abbott Laboratories, North Chicago, Ill.
®[3]Eli Lilly and Co., Indianapolis, Ind.
®[4]Aeroplast Corporation, Dayton, Ohio.
*Doctor Larson's Animal Hospital, Fergus Falls, Minnesota.

When lacerations extend through the teat wall, milk can be seen dripping from the wound, or blood hemorrhaging from the wound is mixed with milk. Animals which are not secreting milk will have blood only coming from the laceration. Usually hemorrhage is profuse at the time of injury. If the teat is presented for treatment at this time, hemorrhage can be controlled by placing a clamp or tourniquet of a rubber band or gauze bandage around the base of the teat. Hemorrhage may have stopped in instances where laceration occurred a few hours previously. In either case, the animal is restrained and the teat is gently cleansed with soap and water or physiological saline solution. It is then dried and 70% isopropyl alcohol solution applied. Following this preparation the teat is anesthetized as described in the foregoing.

If the lacerated edges of the mucosal layer can be brought together, the wound is sutured with the connective tissue layer which lies adjacent to it. A simple continuous suture using 00 chromic catgut is recommended. If the wall is severely lacerated so that it is impossible to repair this layer without excessive tension, this suture line is omitted. Next the remainder of the wall, or, if the catgut suture line is omitted, lacerated edges of the entire wall are brought into apposition with mattress tension sutures. Material having no capillary action and which is non-irritating to tissues should be employed. Stainless steel wire, 32-or 34-gauge, or one of the new synthetic suture materials are satisfactory for this purpose. Sutures are started about ¼ in. from the margin of the laceration. This distance varies according to the thickness of the teat wall and the type of laceration. With a traumatic needle the suture material is inserted through the skin into the muscle and connective tissue down to, but not through, the mucosal layer. If the catgut has been placed in the mucosal layer and the connective tissue adjacent to it, mattress tension sutures should extend down to the catgut suture line. After the needle emerges from the tissue in the wall it is carried across the laceration and inserted in the opposite teat wall just above the mucosal layer or just above the catgut suture line depending on whether the mucosal layer and the tissue adjacent to it has previously been sutured. The needle emerges through the skin about ¼ in. from the edge of the laceration. The mattress stitch is then completed by passing the needle through the teat wall again. The mattress stitch is approximately ¼ in. wide. As many of these stitches are inserted as are necessary to bring the walls into apposition. To facilitate suturing, wires are not twisted or knots tied until all of sutures are in place. Care must be taken to apply only the optimium tension on these stitches to avoid tissue necrosis between the suture material. This allows edges of the wound to separate and necrotic tissue resulting may act as a focus for infection.

The skin is sutured with simple interrupted stitches of synthetic material or silk. These are placed at ⅛ in. interval and are depended upon to make the suture line milk-tight. After these are in place, an infusion needle is inserted into the teat and sterile water is infused under slight pressure to determine if the suture line will keep milk from seeping through. If the suture line leaks, more stitches must be inserted to make it impervious at pressure of milk secretion. Collodion or plastic dressing is applied to the suture line. An antibiotic is infused into the teat and massaged gently toward the gland sinus. The teat infusion tube is removed and a plastic teat tube inserted with the cap removed so that milk will drip continuously. This will minimize stress on the suture line. Collodion or plastic dressing may

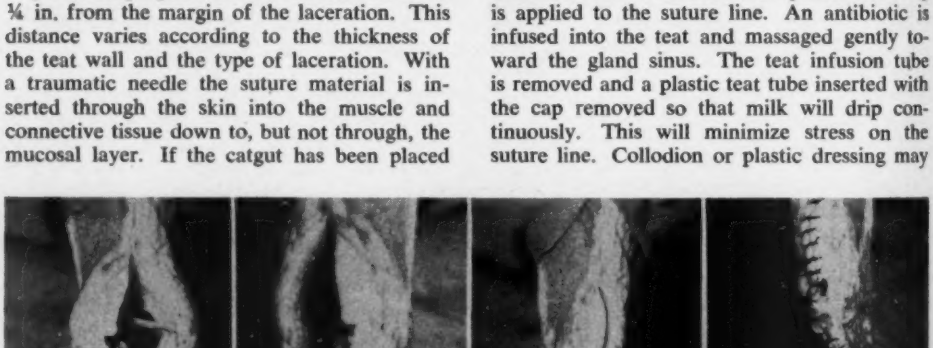

Fig. 3. When lacerations extend through the teat wall, surgical repair under local anesthesia is recommended. Illustrated are steps in the suturing technic. Note close intervals of skin sutures and teat tube in place (r.).

Fig. 4. Contusions on the end of the teat are generally accompanied by extensive swelling. Milk is expressed with difficulty.

be used to assist in keeping the teat tube in place. (Fig. 3).

Aftercare consists of leaving the teat tube in place from three or four days to a week depending on the severity of the laceration. Sutures are removed in seven or eight days. The cow can be milked by machine or hand after the teat tube has been removed.

Handling Contusions

As stated above contusions result from the teats being stepped on by the cow herself or by another cow. Sometimes the teat is also lacerated and in this case it may be feasible to suture the laceration. However contusions are generally accompanied by an extensive swelling and it is difficult to keep sutures in place. Quite often the end of the teat is crushed and the veterinarian is called because either no milk can be removed from the teat or it is expressed only with difficulty. The teat is soaked in a cup or can of a warm, mild antiseptic solution. This facilitates cleaning the area and relaxes tissues around the papillary duct so that the teat will be easier to milk. If there is debris in the papillary duct, Hug's tumor remover should be drawn through the duct once or twice to remove it.* (It is not advisable to incise an acutely inflammed teat to remove milk since the duct will close again in a few minutes.) The milk is then removed by milking or by means of a teat infusion tube and antibiotics are infused. Aftercare consists either of soaking the end of the teat in a warm solution to relax the tissues around the duct to facilitate milking or inserting a self expanding type of teat dilator such as Bengen dilators** for a few days. This dilator expands slowly after insertion when it becomes moistened by milk, and exerts gentle pressure on the walls of the papillary duct. In more severe cases, a plastic teat tube with a removable cap such as described for lacerated teats is inserted and may be left in place for as long as a week. Some teats are so extensively traumatized that after the milk is removed with a teat infusion tube and antibiotics are infused, no further attempts are made to remove milk for 24 to 48 hours or until the inflammation has subsided. In the meantime the teat is soaked at least twice a day in a warm solution. Although leaving the milk in the quarter for this period worries some cattle owners it does not reduce future milk production in that quarter. This pressure over a period of two days is not sufficient to cause a permanent reduction in milk secretion by that quarter.

Some contused teats are infected when first examined. In these instances, the trauma usually has occurred a day or more previously, and the milk may have been removed by the use of teat tubes or dilators. The teat is soaked in a 1:1000 solution of bichloride of mercury. It may be necessary to use an infusion tube to remove the milk. Antibiotics are infused and the self expanding type of teat dilator described above is then inserted. The soaking is continued until acute inflammation has subsided and then, if necessary, the duct is enlarged as described below for "hard milkers."

Obstructions at the End of the Teat due to Anomalies in Development or to Chronic Inflammation

Lesions which interfere with the passage of milk are most common in the region of the papillary duct. When the obstruction is in this area the teat sinus will readily fill with milk. If pressure is applied as in the act of milking, milk will either be forced slowly through the teat orifice or the milk can be detected passing by the fingers upward into the gland sinus. Whether the milk will pass out through the teat orifice or will pass upward to the gland sinus will depend on the completeness of the obstruction. In heifers with congested udders and small teats, it may be impossible to determine if there is milk in the teat or not. In this case it may be necessary to pass an 18-gauge needle through the space normally occupied by the duct to determine if there is milk in the teat sinus.

Incomplete obstruction of the papillary duct may be congenital or acquired. These animals

**Bengen and Co., Hannover, Germany. Distributed by Doctor Jackson, Washington, D. C.

are commonly called "hard milkers." If the condition is congenital in nature, the circumference of the sphincter muscle is too small or the muscle is too strong to allow the papillary duct to expand easily during the act of milking. The acquired incomplete obstructions are the result of connective tissue formation following inflammation which is caused by trauma and/or infection. The resulting connective tissue may have decreased the size of the lumen, or because of the inelasticity of the connective tissue does not allow the sphincter muscle to expand properly.

Fig. 5. Incising the sphincter muscle with round point teat bistoury.

The quarter should be full of milk at the time of surgery in order that the required enlargement of the papillary duct be correctly judged. The involved teat or teats should be tested to determine how difficult it is to force milk through the duct. Occasionally a cow which is thought to be a hard milker actually milks easily enough but has not been taught to "let down" milk properly. This of course can not be helped by surgery.

Operative Procedure for Hard Milkers

After the teat has been cleaned and painted with mild tincture of iodine, the required restraint is applied, and the diameter of the papillary duct is enlarged. In the majority of hard milkers, enlargement of the papillary duct can be accomplished by increasing circumference of the sphincter muscle. This can be done by stretching and tearing fibers of the muscle with Moore's conical dilator or incising the muscle. Various types of cutting instruments have been used for the latter purpose. They range from bistouries of various type, to the sharp pointed (no. 11) Bard-Parker type knife blade, to instruments with concealed cutting edges. The concealed cutting edges in the latter type of instrument are exposed after it has been passed through the papillary duct. All of these instruments are satisfactory in the hands of one who is familiar with their use. With any of these instruments the enlargement of the diameter of the papillary duct is continued until the milk runs freely from the teat orifice. In most animals this is the point where the stream of milk changes from a fast drip to a steady stream. If this point is reached, it should not be necessary to use teat dilators or milk tubes. Several incisions (usually three to five) of the sphincter muscle may be required.

After surgery has been completed, the quarter is infused with an antibiotic and massaged to spread the antibiotic throughout the gland. Aftercare consists of milking a good forceful stream of milk from the teat every half-hour until the milk is no longer tinged with blood. This prevents an obstructing clot from forming in the papillary duct. If the edges of the incisions seal together, they can be separated by rolling the teat between the fingers.[30]

Where there has been an excessive amount of connective tissue formation in the end of the teat more drastic surgery may be necessary. Stoll's teat bistoury which has two cutting edges can be used on some of these cases. As it is inserted, it makes an incision in the opposite walls of the duct. The instrument is then given a quarter of a turn and retracted. This makes two more incisions and leaves a cruciate cut in the wall of the papillary duct. Where some of the connective tissue formations need to be removed either Hug's tumor remover or a reamer can be used. Because of the trauma which occurs during surgery it usually is necessary to use a self expanding type of teat dilator for a few days. Plastic teat tubes with a removable cap can also be used. The cap is removed when the teat is milked.

Complete obstructions at the end of the teat may be a congenital condition. When this is true it is the result of the papillary duct not being canalized during the development of the teat. The lack of canalization extends as far

as the stratified squamous epithelium which is to the region of Fürstenberg's rosette.

The acquired complete obstructions at the end of the teat are the result of injury at the time the cow was not lactating. If the end of the teat is severely traumatized during this period when no milk is being forced through the papillary duct, the walls may heal together and produce complete closure of the duct.

In operating on a complete obstruction at the end of the teat an opening is made where the papillary duct should be with a 16-or 14-gauge hypodermic needle. This opening is then enlarged by incising the sphincter muscle as described for the hard milker. If there is an indurated fibrosis on the end of the teat which does not allow the papillary duct to expand, it may be necessary (as described for incomplete obstructions) to remove some of it with Hug's tumor remover or a reamer. The aftercare is the same as for incomplete obstructions.

Obstructions in the Rosette Area

Obstructions in this area are usually either an enlargement of a fold or a papilloma-like growth adjacent to a fold. Jepsen[15] found vegetative growth in this area in 14% of the teats that he studied. He believed that they were the result of vigorous hand milking. Arnold[2] found these lesions in 2% of the teats that he studied. The lesions in the rosette area can cause partial or complete obstruction of the passage of milk by enroaching on the internal opening of the papillary duct. If the growth is shaped like a flap, it can produce a partial or complete obstruction, according to how it lies. Many growths in the rosette area can be palpated through the wall of the teat while others must be located with a small probe inserted through the papillary duct.

The removal of the obstructions in this area is difficult. Hug's tumor remover can be used for this purpose. This instrument is inserted through the papillary duct into the teat sinus. The hood or umbrella-like top of Hug's tumor remover is then raised to expose the sharp edge of the hood. The teat is held firmly with one hand while the growth is removed by curretting movements with Hug's instrument. After surgery, milk is removed from the teat every 30 minutes as in the case of hard milkers.

Obstructions in the Teat Sinus

Incomplete obstructions in the teat sinus may be caused by connective tissue flaps which act as valves or by connective tissue proliferations which partially or completely fill the lumen. The connective tissue proliferation may be the result of trauma and/or infection. True tumors or polyps are rare in bovine teats.

Removal of connective tissue flaps is complicated because of the difficulty in grasping them. A small probe is passed through the papillary duct into the teat sinus to locate the base of the growth. Then their removal at the point of attachment can be attempted with Hug's tumor remover. Sometimes it is possible to force them outward with milk from above to assist grasping. Hudson[15] has devised a corkscrew-like instrument which is inserted through the papillary duct, screwed into a previously made hole in the growth, and then retracted to tear the growth loose.

Another method of handling obstructions in the teat sinus is to incise the wall of the teat over the obstruction and remove by dissection.[5,10,12,17,19,20,27] When the teat wall is incised the surgeon can see the offending growth and completely remove it.

The teat is anesthetized, and, if the quarter is not full of milk, a clamp such as a compression forceps or a tourniquet, is placed at the base of the teat to control hemorrhage. If the quarter is full of milk, the incision is made and the milk allowed to run out of the quarter before hemorrhage is controlled. Incision is made parallel to the long axis of the teat and should extend both above and below the offending growth to allow adequate exposure. Bleeding vessels which can be grasped are ligated. The obstruction is then grasped with a pair of forceps and dissected out with a curved pair of scissors. The wall is sutured as described above for lacerations which extend through the wall. The same aftercare is given as for lacerations. (See fig. 6.)

Obstructions in the teat sinus which are congenital in origin vary from failure of the teat to canalize at its junction with the gland sinuses, to failure of the entire teat sinus to canalize. When the failure to canalize is at the junction of the teat and gland sinuses there is often formed a membranous structure separating the two sinuses. Because this occluding structure is thin it has been called a "vail."[5] If a probe is inserted through the papillary duct, the occluding structure can be located. Palpation usually reveals milk in the gland sinus and a minimal amount of fibrous tissue around the obstruction. (A large amount of fibrous tissue indicates that the animal had infection in the quarter when a calf and that the case is not operable.) A vail is best treated

by rupturing with a blunt pointed probe or bistoury. Moore's conical dilator can be used for this purpose by insertion of the instrument through the papillary duct. The end of the teat is allowed to invert so as to allow the point of the instrument to rupture the membrane without enlarging the papillary duct excessively. Edges of the membrane are more apt to heal together if incised.

Developmental anomalies in which the entire teat sinus failed to canalize are inoperable and therefore best left alone. On palpation, these have the character of a cord-like structure in the center of the teat. If one does make an opening through the tissue, it soon closes and there is possibility of introducing organisms from the papillary duct and producing mastitis.

Other obstructions which completely bar the passage of milk through the papillary duct, if not too extensive, are operated by incising through the wall of the teat as described above. Generally speaking the higher or more proximal in the teat sinus a growth is located the poorer the prognosis. Complete closure of the entire teat sinus as the result of trauma and/or infection is not operable and is best left alone.

Fistulas

Teat fistulas may be congenital in origin or result from injury. Those which are congenital

Fig. 6. Sequence of surgical handling of obstruction of the teat.

are usually small and pass in an upward direction from the opening in the skin. Teat fistulas which form as the result of injury may also be small but many are quite large. Teat fistulas are best operated when the cow is not milking. The teat is prepared and anesthetized. In case of the small fistulas an eliptical piece of skin which includes the opening of the fistula is removed. The mucosal layer of the fistula is then dissected out. If the fistula is too small to completely remove the lining epithelium without making a much larger opening through the wall, as much as possible is removed and the rest traumatized with the point of the knife. If the mucosa lining the fistula is left intact, edges which are brought in apposition will not heal. Mattress tension sutures as used in suturing the teat wall, are inserted and the skin sutured separately. Sometimes a purse string suture can be used to advantage. Edges are debrided in the large fistulas and the wall sutured as described for lacerations.

The disturbing thing about teat fistulas is that the owner wants them treated when the cow is milking. Larson[13] and Dubigk[6] in a limited number of trials report success with a new method which can be used while the cow is in lactation. A plastic teat tube is inserted in the teat and the cap is removed to allow milk to flow freely. Then the teat is held in a horizontal position and the opening of the fistula together with a small amount of tissue surrounding it is covered with a plastic dehorning fluid containing trichloracetic acid. The teat is held until the solution dries before it is released. The teat tube is removed in a few days. The plastic seals the opening of the fistula while the trichloracetic acid cauterizes the lining of the tract. The resulting tissue reaction closes the opening. This method is not successful if the fistula is large.

Causes of Failure in Teat Surgery

Teat surgery is not without its pitfalls and failures. In reviewing the failures it has become apparent that they fall into one or more of the following categories: Some cows reinjure the teat and tear out sutures or increase the inflammatory reaction. This may be done by stepping on the teat or lacerating it on barb wire. Occasionally aftercare is at fault. In operations on hard milkers the teat may not have been properly milked out after the operation. Instead of soaking the end of the teat to remove an eschar the caretaker may have picked it off and introduced infection. The suture line may have been traumatized by the milker or perhaps milk tubes or dilators were used indiscriminately or without proper care. Infectious microorganisms present in the quarter may not have been suceptible to the antibiotics used. The lesion may have been one for which there is no successful treatment known, or, the laceration may have been so severe that the edges could not be drawn together for suturing without undue tension. The last reason for failure in teat surgery is error in judgment on the part of the surgeon. As examples of this, sutures may have been drawn too tight in suturing the teat wall, or, in the treatment of hard milkers, circumference of the sphincter muscle may not have been enlarged sufficiently.

Conclusion

Not all of the methods or instruments used in teat surgery have been described in this paper. The ones which have been described have been most successful in the authors' hands. It is to be emphasized that if a particular method is being employed and is successful in the reader's hands, the writers would be the last to suggest a change. However, if the reader's results in the treatment of a condition are not good, then he may benefit from this discussion.

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Penicillin Sensitivity

Relief from adverse penicillin reactions estimated to affect 600,000 persons annually is promised by the research work of two Midwest physicians. Papers presented at the American Medical Association report successful results in relieving allergic manifestations to penicillin promptly following the injection of penicillinase, a refined enzyme produced by Schenley Laboratories. The new product will be introduced to the medical profession later this year.

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Coccidiosis appears to be much less important in swine than in other species of livestock.—*Leslie M. Hutchings, D.V.M.*

Genus Microplasma

Microplasma has been proposed as the genus name for that group of organisms referred to as PPLO (pleuropneumonia like organisms) responsible for a type of pericarditis, and arthritis in swine, infertility, pneumonia, arthritis, and mastitis in cattle, contagious agalactia and pneumonia in sheep and goats, and a respiratory tract infection of sheep. Three species also attack dogs, including one responsible for infertility in Greyhounds, another for chronic cough, and a third as agent for secondary infections in chronic pneumonia in cats.

In discussing some preliminary studies concerning this group of organisms, Dr. W. P. Switzer of the Veterinary Medical Research Institute, Iowa State College, Ames, stated before the Conference of Veterinarians on July 16, 1957, that antibiotics appear inadequate as satisfactory therapeutic agents. Selected sulfonamide appears to be reasonably effective for treatment.

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Vitamin D Poisoning

Recent investigations suggest that there may be potential hazard in vitamin D feeding, especially when given in amounts greatly exceeding physiological requirements. Vitamin D intoxication may produce normochromic and normocytic anemia which may result from renal impairment due to hypercalcemia, according to article in *Lancet*, 6965:416 (Feb. 23), 1957.

Conclusions after animal experimentation are that vitamin D in excess and cholesterol may be related to the devolpment of hypercalcemic states. Deficiencies in the diet of essential fatty acids may cause cholesterol to become esterfied with abnormal fatty acids and thus produce atheromatous plaques.

▼ ▼ ▼

It is estimated that a single complex protein molecule may yield as many as 1,000 of the simpler amino acid molecules. The breakdown of proteins into amino acids occurring through the action of digestive enzymes, pepsin in the stomach, and trypsin in the small intestines, can also be accomplished by boiling with strong acids.

To date 80 different kinds of amino acids are known to exist in nature. Of these, 24 are recognized as degradation products of food proteins.

Differential Diagnosis And Treatment Of Hog Cholera, Acute Erysipelas And Acute Salmonellosis †

LEE T. RAILSBACK, D.V.M., Ellsworth, Minnesota

THE problem of differentiation between hog cholera, acute salmonellosis, and acute swine erysipelas is not new. Actually, I believe in my practice area, at one time, farmers considered them one and the same disease. Although swine erysipelas was not recognized in this country until 1931, old timers tell me that they feel certain that prior to that time it was often misdiagnosed as hog cholera. For many years hog cholera and acute salmonellosis were thought to be one and the same disease by our research men, with *Salmonella cholerasuis* being the causative organism.

All three diseases occur in the acute septicemic form, and as such it may on occasion be quite difficult to differentiate between them. Any two or all three of them not only may, but quite often do, co-exist, and since there is much similarity between these three septicemic diseases, it is imperative that we use all our aids, such as farm history, herd history and observation, symptoms, postmortem lesions, laboratory findings, and our knowledge of duration and severity of each disease to help arrive at a diagnosis.

Farm History

Farm history is quite valuable in making a diagnosis. Erysipelas and Salmonella organisms have a tendency to remain in the soil on certain farms from year to year, and both may stay for some time even though swine are not present. Hog cholera virus does not perpetuate itself over long periods outside the body of the hog. Out of its natural host, the hog or its carcass, the virus is difficult to keep alive except under extreme cold, and is readily killed by heat and sunlight. I have never felt hog cholera remained on a farm long after a break if the weather is warm and a good job of cleaning the premises is done.

†Presented at the 73rd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 16-18, 1957.

Herd History and Observation

Both erysipelas and salmonellosis may revert from the acute septicemic type to the chronic, then back to the acute. Hog cholera exists, except on rare occasions, only as an acute disease.

Herd observation is invaluable. A veterinarian in whom I have much confidence once told me that he felt it ought to be a "penitentiary offense" to diagnose hog cholera in a herd without making an "on-the-spot observation." He was referring to these "one-pig autopsies" that are sometimes made at the office or autopsy room, and many times by veterinarians who are not regularly in charge of the herd. Now, I do not know whether I would go along with the "penitentiary offense" idea, but I do believe it is a grave mistake to make a positive diagnosis without thorough investigation, and many times does a colleague a great injustice, puts a swine-owner to extra expense, and may cause much misunderstanding. Pigs should be observed in their home environment. Veterinarians should see how they move, how they act, get their temperatures, observe the husbandry practices, take a history of what immunizing agents have been used, when and under what circumstances they were used, know the farm history, and possibly have a report from specimens forwarded to a qualified laboratory. These items are essential for an intelligent diagnosis.

Symptoms and History

Hog Cholera. Briefly, symptoms that characterize hog cholera to me are extreme weakness with a marked depression and practically a total loss of appetite, with a temperature range of from 105 to 106.5F. Affected pigs have a hard time getting to their feet, and when they do, hind-legs may not trail properly but the animals appear to wobble from side to side. They knuckle over at the pastern joints of the rear legs. They are quite depressed,

giving the impression they are "thinking." They often "card up" by laying in piles. They rarely eat; maybe nibble a time or two if you get them to the feed, and may sip some water. They give the impression they are tiring fast and just have to lie down. Eyelids may get "stuck up." Diarrhea and vomiting may develop.

If we have a client that watches his herd with an "eagle eye," and they are home-grown pigs, he may have only one or two sick ones. If the client is more careless or for some reason slighted the observation of his herd, he may have several pigs that have recently sickened; but when we delve into the history, we may learn that one, two, or three weeks prior to our visit he had a pig or two that was sick and finally died while he was busy with harvest or some farm operation and never gave much thought to the incident.

If pigs have been purchased from a "scalper" or a sales barn, we will not have this history, but may have many pigs sicken within a short period.

Salmonellosis. Pigs with salmonellosis may exhibit many of the same symptoms of a hog cholera pig. In Salmonella breaks, we usually see a real sick pig or pigs with temperatures varying from 104 to 108F. One or more pigs may have died prior to our visit. If it is early in the break, temperatures may be more apt to fall in the 106 to 108F. bracket. Symptoms will include diarrhea and poor or no appetite. The extreme weakness and mental depression that is observed in hog cholera is not as much in evidence unless the disease is in its final stages. Pigs will usually run and may be quite difficult to catch unless they are in close quarters. When caught, they usually have a pretty fair squeal. History is quite important. There will usually have been some diarrhea in the herd with the numbers affected increasing following some change in feeding or management. Factors commonly observed in my practice are weaning, change in protein feed, vaccination six to 14 days previously with virulent virus or one of the modified hog cholera viruses, or a recent change from dry lot to pasture.

Erysipelas. To me, there is not nearly as much resemblance between acute septicemic erysipelas and hog cholera or acute salmonellosis as there is between hog cholera and acute salmonellosis. An "erysipelas pig" usually has a stiff gait, tendency to walk on its toes, with an arched back, and will usually be quite alert. Affected animals will remain lying down as you observe them at a distance. They may be watching your every movement with a clear, alert eye. They will give you the impression you can walk over and pick them up or take their temperature, but will jump and run before you can touch them. As you observe them, they may warm out of their lameness to a certain extent. They usually will not have a diarrhea and usually will drink and eat. Catch them and they will fight as much as a healthy pig. Body temperature will vary from 106 to 109.5 F. or occasionally will rise beyond the calibration on your thermometer. Temperatures will drop if the pigs live and may even return to normal if the infection tends to become localized or chronic. Areas of the skin may become raised and reddish or purple, or reddish-purple. If these areas are examined closely, they will be straight-edged around the perimeter.

Duration of Sickness and Severity of Attack

Hog Cholera. Contrary to the belief of many of our clients, hog cholera is not a fast killer, but a sure one. Hog cholera usually does not attack the entire herd on the original entry, unless we have circumstances such as hogs being fed garbage containing live hog cholera virus or perhaps the herd being moved through infected premises such as a "scalper's" centralization point. In home-raised droves, a thorough herd history usually reveals one or two sick pigs during the period two or three weeks before a wave of hog cholera. These pigs may have died a week or two after sickening and have been pretty much overlooked. Then, when we are called there may be several sick that have broken down after being exposed to the original case, and many still apparently healthy. They may not break until after the normal incubation period from the original wave of sick pigs. Although hog cholera is not a fast killer, it is a sure killer. It is a rarity when a "hog cholera pig" survives. If left to run its course, it will take a month or more. The farmer will get tired waiting for a lot of them to die. In the end, it will practically "wipe out" the herd.

Salmonellosis. Salmonella can be a mighty fast "killer" if our client has not been watching his herd closely. He may find a dead pig before he realizes he is in trouble. Thorough herd histories will usually reveal there has been some diarrhea in the herd prior to a severe attack. Such histories will usually also reveal something that happened in the seven to 14 days prior to a severe outbreak that "triggered" the break. Differing from hog cholera, most cases of salmonellosis can be saved by administration of biologicals, drugs, and antibiotics

available today. The recovery of sick animals is a good aid in differentiation. If left to run its course with no treatment instituted, it can be mighty rough, practically, if not totally wiping out a herd. Many chronics may develop and we may have apparently healthy acting and doing pigs that become carriers or "typhoid Mary's" if these animals are kept for breeding stock. They will pass the disease on to their baby pigs. Most so-called outbreaks of white scours in baby pigs, in my practice, have been found to be salmonellosis. If these pigs break again later on following some change in feed or management, there should be no cause to wonder as to the origin of the disease. In my opinion, they have been harboring it in their system since infection from their mothers as "babies." Even though this be the case, it rarely occurs when I can get one of my clients not to keep breeding stock from a litter that had "white scours" as babies.

Erysipelas. Erysipelas can kill fast. Owners may find pigs dead, but most cases of acute erysipelas will last at least a couple of days even if untreated. It may hit from one to 40 or 50% of the herd at once, but in most outbreaks in my practice, not over 5 to 10% of the herd is affected when first noticed. The only way to be sure of getting all sick pigs in a herd is with a thermometer. Individuals that appear to be normal may carry temperatures of 106 to 108F. Most cases of acute erysipelas respond readily to treatment. This is a good aid in diagnosis. If preventive measures are not used in a herd, erysipelas may stop after attacking 1% of a herd, or it may keep developing until practically the entire herd is infected.

Postmortem Lesions

As I have pointed out, all three of the diseases we are considering are acute septicemias, and as acute septicemias they may display all the postmortem lesions of any of the septicemias. In some of the septicemic diseases, these lesions are much more numerous than in others. And, gentlemen, I want to confess right here that I consider myself a very ordinary pathologist, because I am not able to sit down on a "stump," post a pig, and then look my client straight in the eye and say "John, it's hog cholera, or salmonellosis, or erysipelas." Being a very ordinary pathologist, the things I see on autopsy I may describe in very "clumsy terms" to a good pathologist.

Hog Cholera. I will never forget a statement by the late Dr. A. T. Kinsley which he made at a meeting of the Kansas Veterinary Medical Association while I was a student in school during the mid 30's. He said, "Gentlemen, early uncomplicated hog cholera is a disease of very few lesions." Much of the hog cholera we see in practice is complicated hog cholera. For this reason — I have found it quite worth while to visit a virus production line occasionally to get and keep the lesions observed in uncomplicated hog cholera clearly in mind. When I see those pigs before the kill, then see the lesions on the production line, it makes me wonder how a pig can be so sick and manifest so few lesions. The lesions are not one-tenth as numerous as the "typical cholera lesion picture" I had in mind when I left veterinary school.

The lesions I see on the virus production line are a few pin-point hemorrhages on the kidney, peripheral hemorrhages in the lymph glands, perhaps a few hemorrhages on the lungs, epiglottis, bladder, and margins of the spleen. These are all lesions that we may find in any septicemia of a pig, but they are not numerous in the early stages of cholera. Compared with the lesions observed in most autopsies in the field, I agree with Doctor Kinsley. Early uncomplicated hog cholera is a disease of very few lesions. These hogs have been visibly sick for only two to three days. We may see a similar picture in field hog cholera if we autopsy pigs that have been visibly sick only two to three days. If we post a pig that has been visibly sick a week or more, and perhaps dead from the disease and complicated with Salmonella and other secondary infections, lesions observed may reveal greater pathological changes. There is much more to be gained from autopsies of early cholera that is not as apt to be complicated with secondary invaders than from postmortem examination of a pig in the terminal stages of the disease. It is a grave mistake not to seriously consider a hog cholera diagnosis when history and symptoms suggest hog cholera, even though few lesions are observed on autopsy. When I have hogs with a hog cholera history and symptoms, the fewer lesions I find on postmortem, the more suspicious I get. If they look like hog cholera, act like hog cholera, and are dying like hog cholera, we better be thinking about hog cholera regardless of postmortem lesions. The longer a pig has been sick with hog cholera, the more apt is the condition to be complicated with secondary invaders. The longer it has been sick, since they have practically a complete loss of appetite, the more emptied the stomach. In uncomplicated hog cholera, severe gastritis is not evident.

Salmonellosis. In acute salmonellosis, we

may have the same septicemic lesions seen in hog cholera, but are usually much more numerous and pronounced. A pig that has been sick 48 to 72 hours or even less may show more septicemic lesions than a hog that died with hog cholera after being sick for ten days. Stomach may be completely filled, with the pyloric region practically always inflamed. Many times it actually looks charred or "parboiled." The spleen may be enlarged and often purplish. The small intestines may be inflamed, the large colon and cecum may be hemorrhagic and thickened, with ulcer formation, especially in region of Peyer's patches. Hemorrhages in the lungs and lymph glands are much more numerous than I associate with uncomplicated cholera. The lesions I see in salmonellosis more nearly duplicate the "typical hog cholera lesion picture" with "turkey egg kidney" and all that I had as a new graduate, than do the lesions I now like to associate with uncomplicated hog cholera.

Erysipelas. The lesions of septicemia are observed in pigs with acute erysipelas in a varying degree. In a large percentage of instances, they are not numerous. Lymph glands usually are swollen or "juicy," and with or without peripheral hemorrhage; quite commonly sharp-edged hemorrhages are observed on the lungs. Spleen may be from slightly to greatly enlarged, and I feel quite often brighter red than normal. The stomach is usually full, but will not have the red patch on the mucosa of the pyloric region seen so frequently in salmonellosis. "Paintbrush" hemorrhages on the serous surface of the stomach are by no means constant, but they are observed occasionally. To me, it doesn't mean anything if they are absent, but in my practice, I see them more often on erysipelas pigs than any other condition.

Prognosis

Hog Cholera. Prognosis is very grave. Swine with hog cholera die. Some swine with modified hog cholera may live. In this category, I refer to pigs that may have some degree of immunity before contracting hog cholera, such as pigs that have been vaccinated with an inactivated vaccine less than the required length of time to develop a solid immunity, or ones that have been vaccinated long enough that the immunity is something less than solid, or pigs that were not up to par and never did develop a solid immunity. Many pigs that are in "risky" herds or "trouble" farms, or for any reason are not to be classified as a good risk, are often vaccinated with inactivated vaccines. There are instances where pigs that have been vaccinated with serum and virulent virus fail to develop the expected immunity and later contract cholera. I feel there have been instances that our modified viruses have been modified to such a degree in an effort to minimize postvaccination troubles that we have had immunity breaks later on. There have also been other instances where our modified viruses have not been modified enough and we actually give the pigs, injected with modified virus, hog cholera before they have had a chance to develop immunity. I feel these breaks in immunity do occur occasionally, and when they do it has been my experience that not as large a percentage of the pigs that sicken die, as when we have cholera in a herd that has never been vaccinated. But most of these pigs that quit eating over two or three days usually start looking more like hog cholera, acting more like hog cholera, and usually die even after they have lingered for as long as three weeks. If most of the sick pigs start to recover, regardless of what immunizing products they have been subjected to, it is not cholera.

Salmonellosis. In 1957, I would say that the prognosis on a drove of pigs affected with Salmonella is favorable but guarded. With the drugs, antibiotics, and biologics available today, most herds will respond favorably. Death loss in most herds will not be high. Some of the recovered pigs may remain carriers or "typhoid Mary's," as already discussed. This fact should be taken into consideration when selecting breeding stock.

Erysipelas. A large percentage of acute erysipelas pigs will make a good recovery in 12 to 36 hours following treatment; and in the period following treatment gain as rapidly as pigs in the herd that were not affected. Pigs that have apparently recovered from acute erysipelas should be earmarked and not kept for breeding stock. There will be a small percentage that may develop some symptoms of chronic erysipelas later on.

Laboratory Examination

Specimens should be sent to the laboratory from all autopsies in all herds until a definite diagnosis is made and treatment is accomplishing the expected results. I have followed this practice for close to ten years now, and I can assure you it has done more to add to my confidence as a diagnostician than any other single thing I have done. I would never have entertained any idea of talking today had I not had many laboratory reports confirming my diagnoses. Needless to say, we can not wait for a

laboratory finding before starting treatment. Treatment of at least the sick individuals must begin immediately. The organs which I usually forward for study include: The tied off heart, part of a lung, a kidney, spleen, some lymph glands, with anything else that looks like it should go. These are put into a fruit jar which is usually borrowed from my client; then frozen in the freezing compartment of the ice box. I outline a short history, usually on a 4 in. x 6 in. memorandum pad; my office man packs the frozen specimen and history, with a can of ice and sends it by first class mail, special delivery, to the laboratory. Most laboratories will give a bacteriological analysis in 24 to 72 hours. I find this information valuable even though my herd may be getting along fine following treatment. A laboratory confirmation will help build confidence in the diagnostician and increase clients' confidence. If the report does not confirm diagnosis, it may be invaluable as guidance for further treatment. If the laboratory performs filtration and animal inoculation which requires several weeks, it is still satisfying to eventually get information developed from such tests.

Treatment

Since response or lack of response to treatment is a great aid in differential diagnosis of these three diseases, I find it impossible to discuss diagnoses without discussing treatment.

There is no treatment for hog cholera. Pigs with hog cholera practically always die regardless of how much antiserum is administered. As I have already mentioned, hog cholera, acute erysipelas, and acute salmonellosis can co-exist. Often we are called to droves of sick pigs that have not been immunized against hog cholera, and since there is so much resemblance between these diseases, it is foolish not to recommend that the herd be protected against hog cholera even though signs indicate acute salmonellosis or erysipelas.

Hog cholera antiserum is beneficial in treating practically any disease of swine except hog cholera. The more serum the better, but if you give at least a prophylactic dose of serum along with the Salmonella or erysipelas treatment, it will strengthen Salmonella or erysipelas treatment; and in my opinion, is sound therapy. If after having explained the possibility of hog cholera being present to our client, even though we feel our final diagnosis will be salmonellosis or erysipelas and we are sure he understands the consequences, he may want to gamble on hog cholera against my recommendation. If this is the case, I let the decision be his own. If the sick pigs start to recover, I know I am not dealing with hog cholera. When I am in a hog cholera outbreak, I tell my clients that any hog that is "eating and popping corn" five to seven days after administration of serum will live. Those that are in the incubation period when serum is administered will sicken and die. When I feel sure I am dealing with hog cholera, I double my therapeutic dose of serum and administer modified virus simultaneously. If I feel I am dealing with acute salmonellosis, I give a prophylactic dose of serum, no virus, and treat for salmonellosis, and delay my modified virus for seven days. If I feel I am dealing with erysipelas, I give a prophylactic dose of serum and modified virus, and erysipelas serum and culture plus penicillin to the visibly sick pigs.

To me, one of the most interesting aspects of salmonellosis is the number of methods of treatment any given group of veterinarians will use to treat it. Question 50 veterinarians and there will be a lot of similarity in methods but none identical.

We do have drugs and antibiotics today for treatment that are much better than those we had or knew how to use just ten years ago. The broad spectrum antibiotics and streptomycin used in the feed or water, or both, are popular with many veterinarians. Arsenicals, vitamins, or sulfonamides are popular with many others. Some may prefer just to correct the diet and prescribe alkaline preparations. I doubt if there is a "best" that will cover all herds.

Regardless of which treatment employed, I feel that if we take care of the dehydration in the pigs in conjunction with our treatment, we will have more gratifying results than if the dehydration is disregarded. Three drugs or products that help relieve dehydration are: Salt (NaCl), sodium arsanilate, and the broad spectrum antibiotics. For me, they are the most effective in the order named.

Many men feel they receive benefit from *Salmonella cholerasuis* bacterin in treating salmonellosis. I have not used them enough to form an opinion.

Hog cholera antiserum is valuable in treating salmonellosis. It can be mixed with one of the injectable sulfonamides. I use 25% sulfamethazine in proportions to give 0.5 to 1 gr. per lb. of body weight, and vary serum from a prophylactic to a therapeutic dose depending on how the pigs look. This usually gives gratifying results in acute outbreaks. This is a practical treatment in hogs not immunized

against hog cholera, and should be followed with some sulfonamide treatment, either in the feed or water.

A treatment I use quite frequently, especially in warm weather, is a combination of sodium sulfathiazole and salt (NaCl), and is administered as follows:

1. Make a medium slop of ground oats, and skimmed milk or buttermilk, or semi-solid buttermilk (1-10). I explain that I think of medium thick slop as being about the consistency of fresh cow manure.

2. To each 10-gallon of this slop, add 1 lb. of salt and one pint of sulfonamide (stock solution made by adding 1 lb. of sodium sulfathiazole to 1 gal. of warm water).

3. Give pigs all this slop that they will eat three times a day. Continue treatment three to four days.

4. Supply drinking water at all times.

5. Pigs on this treatment should be in dry lot and preferably on a concrete feeding floor.

This treatment may be followed at times with 437.5 gr. sodium arsenilate in 50-gallons of drinking water for one week.

There may be many that disagree with me, but I prefer to feed no corn to a pig with acute salmonellosis. After recovery, ⅓ corn by weight in the grain ration is all that is advisable up until the pigs weighs 100 lb. After that, corn can be increased and other grains decreased.

Another treatment I use frequently is a combination of sulfonamide and arsenic and vitamins in the drinking water. This is used according to recommendations of manufacturers and seems to combine the values of both drugs.

In treating acute erysipelas, I use two products, namely; procaine penicillin in oil and erysipelas antiserum. Procaine penicillin in oil is the product of choice, because of longer periods of therapeutic action. It is administered in doses of not less than 3,000 units per lb. body weight, and injected into the ham. I graduate serum dosage from 5 cc. in baby pigs to 20 cc. in a 75- to 100-lb. pig, to 40 cc. in sows. In most cases, this treatment is not repeated, but it may be in some instances after 48 hours, if the patient carries a temperature above 104F.

Summary

1. Hog cholera, acute salmonellosis, and acute erysipelas are easily confused.

2. If hogs have been immunized against hog cholera, it makes a diagnosis of acute salmonellosis or acute erysipelas much less complicated.

3. If hogs are not immunized against hog cholera, it is quite hazardous and foolish to make an unqualified diagnosis of acute salmonellosis or acute erysipelas and completely disregard hog cholera. Such a diagnosis may prove costly to the client and embarrassing to the veterinarian.

4. Temperatures above 107F. are more indicative of erysipelas or salmonellosis than hog cholera.

5. Swine with acute salmonellosis or acute erysipelas may be treated with satisfactory results to both the veterinarian and his client.

6. Pigs with hog cholera practically always die.

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Accurate Rumen Function Studies Made Possible by New Technics

Criticism of rumen function studies conducted under conditions that did not allow for normal functioning of absorption through the wall has resulted in positive steps taken by University of Maryland dairy scientists.

A recently designed apparatus was demonstrated at the American Dairy Science Association meeting at Oklahoma A. & M. College, Stillwater. It involves the use of a live rumen from a sacrificed animal suspended in solution, where it continued to function for hours.

"Rumen Perfusion: A New Technique for Ruminologists" designates a discussion by R. D. McCarthy and associates which described the apparatus as a rumen suspended in solution, equipped with an artificial heart or pump used to circulate blood through the vessels of that organ. An artificial lung, also developed, reoxygenates the blood each time it completes its passages through vessels in the rumen wall. This is the nearest approach so far designed for the study of digestion in cattle, sheep, and goats.

Hopefully much useful information will be learned through the use of this apparatus and the technics of radioactive tagged feed ingredients. The problem is a complex one directed toward what feedstuffs in what combination may be expected to result in the end-products desired.

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Though dairymen counted less than 21,000,000 dairy cows to start 1957, the smallest number on record in 33 years, total milk production continues to set new records.

Credit to the intelligent application of Mendel's laws and constant improvement of feeding practices has brought milk production from 2,000 lb. per cow in 1880 and 3,600 in 1890, up to 6,000 lb. per cow in 1956.

Cesarean Section In Cattle†

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CESAREAN section is indicated to relieve many of the more difficult types of dystocia suffered by cattle. These include dystocia in which it is easier and safer, from the standpoint of the life and future breeding ability of the dam and the life of the offspring, to deliver the fetus by section. Maternal causes of dystocia in which cesarean section may be indicated, include: Immature birth canal, diminished size of the birth canal due to neoplasms or scar tissue, deformed pelvis, failure of the cervix to dilate, closure of the cervix such as may occur in neglected cases, uterine torsion, and hydrops amnii. The fetal causes of dystocia in which cesarean section indicated are: Abnormally large fetus, malposition, monstrosity, and an emphysematous fetus.

After examining the cow the veterinarian should decide whether the fetus is best delivered by cesarean section or by some other method. If section is indicated, the operation should be performed at once. When other procedures are tried first, the dam becomes exhausted, the genital tract becomes traumatized and perhaps contaminated, the veterinarian often becomes fatigued and the possibility of the dam and the fetus surviving is lessened.

The operation can be performed through incisions made in the left abdominal or flank region, the right abdominal or flank region, or the ventral abdominal region. In each of these regions several sites may be used. The operation also can be performed in a standing or recumbent animal depending on the preference of the surgeon and the site of the incision. In no other operation does the surgeon have such a large number of operative sites available to expose or make available the target organ. Sites for incision can be grouped as follows:

Standing Position.

1. Left abdominal wall; (a) upper abdominal wall; (b) middle abdominal wall.

2. Right abdominal wall; (a) upper abdominal wall; (b) middle abdominal wall.

Recumbent Position.

1. Left abdominal wall; (a) upper abdominal wall; (b) middle abdominal wall; (c) lower abdominal wall.

2. Right abdominal wall; (a) upper abdominal wall; (b) middle abdominal wall; (c) lower abdominal wall.

3. Midline; (a) left of the midline; (b) directly on the midline.

Right of the Midline Approach

Restraint of animals operated in the standing position depends upon the ease with which the individual can be handled. More tractable animals can be restrained in a stanchion while the less tractable ones need to be placed in a chute with removable sides. The incisional sites, however, are necessarily limited to the upper and middle abdominal areas. The danger of intestines eviscerating through incisions made at other sites is too great for their use on a standing animal. The recumbent position is often preferred for operating on highly nervous animals. When general anesthesia is used and/or the lower abdominal or midline approaches are used, the subject must be operated in the recumbent position.

There are several factors which should be considered before the surgeon chooses the site for the incision. The danger of herniation is less when the upper and middle abdominal sites are used. Excessive edema is less likely to follow the use of the upper abdominal site as there is good tissue drainage in that area. On the other hand, the uterus is less accessible from the upper abdominal incision than from the middle abdominal and other sites mentioned. The lower abdominal and midline incisions have the advantage that the uterus is more accessible and also the animal may be maneuvered to lessen the possibility of uterine contents spilling into the peritoneal cavity. The danger of wound dehisence, however, is

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greater. When the left abdominal approach is used, the rumen usually prevents evisceration of intestines during surgery. Its disadvantage is that at times the rumen is full of ingesta causing difficulty in bringing the uterus to the incision. This is especially true if a right horn pregnancy is present. When the right abdominal approach is used, the presence of intestines and omentum tend to complicate surgery unless the omentum is used as a shelf to hold the intestines back and prevent evisceration.

Bearing in mind the advantages and disadvantages of each operative site, the surgeon usually selects one and performs most sections through that site. However, there are times when approach must be altered to fit the individual patient. If the fetus can be palpated lying against the left or right flank, the site for incision should be over it. When a monstrosity or an emphysematous fetus is present, one of the sites at or near the midline is best. If the animal has an usually large mammary gland which encroaches upon the area in which one of the midline incisions is to be made, then that incision should be avoided.

Preparation of the Patient

Preparation of the surgical field follows restraint. The surgical field is clipped with a fine-head clipper. Skin is then scrubbed with tincture of green soap or hexachlorophene-detergent for five minutes or more. Following scrubbing, area is rinsed with water until clean and allowed to dry. If the surgical area still appears to be covered with fatty material, ether may be used to remove this material. Seventy per cent isopropyl alcohol solution is applied to the skin with cotton or sponges starting at the proposed incision site and working away from it. This tends to wash any remaining bacteria away from the incision. The area is allowed to air dry and 2% tincture of iodine solution applied. The iodine is often removed from tender skinned animals with 70% isopropyl alcohol solution.

Anesthesia and Restraint

Standing position—

Paravertebral Nerve Block. This is used more often for anesthesia of the upper abdominal wall but if administered properly it will also produce anesthesia of the middle abdominal wall.

Local Infiltration. This method is the most popular for producing anesthesia, especially in beef cattle.

If straining is present, epidural anesthesia is administered in addition to either paravertebral block or local infiltration. Some practitioners routinely administer epidural anesthesia to prevent the possibility of straining and to control tail movements.

Recumbent position—

General Anesthesia. Some practitioners use general anesthesia on all cases while others use it only in intractable patients. Chloral hydrate or a combination of chloral hydrate and magnesium sulfate administered intravenously are agents most often used in this country.

Combination Anesthesia. The animal is sedated with a general anesthetic agent and a local anesthetic agent is infiltrated along the site of the incision.

Surgery

Incision in Upper Abdominal Wall. The incision is started about 3 in. below the transverse processes of the lumbar vertebrae, then extended through the middle of the para- or sublumbar fossa in a ventral and slightly anterior direction. The incision should measure 12 to 18 in. in length.

Incision in the Middle Abdominal Wall. Incision is begun about 8 in. below the transverse processes of the lumbar vertebrae in the center of the area between the last rib and the ileum. This incision also extends in a ventral and slightly anterior direction and is continued until 12 to 18 in. in length.

Incision in the Lower Abdominal Wall. Milne[4] described the site for this incision. The patient must be in lateral recumbency for this approach. Incision is begun about 12 in. below the transverse processes of the lumbar vertebrae and in the center of the area between the posterior border of the last rib and the anterior border of the ileum. The incision is extended in an anterior and ventral direction to avoid the fold of the flank. When the fold of the flank is incised it often becomes quite edematous and usually heals slowly. Skin incision is stopped before the subcutaneous abdominal or milk vein is reached.

Midline Incision. The patient is restrained in dorsal recumbency for this type of incision.

Left of Midline. For midline area approach the patient must be restrained in dorsal recumbency. Two sites are used for this approach. Götze[5] of Germany makes the incision about 3 in. lateral to and parallel to the subcutaneous abdominal vein. The incision is made 12 to 14 in. in length when complete. The other site to the left of the midline is between

the midline and the subcutaneous abdominal vein.

Midline. The incision is made directly on the midline as described by Blendinger.[1] It is begun just anterior to the mammary gland and is extended toward the xiphoid cartilage for a distance of 12 to 14 in. Skin, linea alba, and peritoneum are the only structures comprising the abdominal wall in this area.

Right of the Midline. Frank[2] advocates this method and it is the most used site for cesarean sections performed at or near the midline in this country. The incision is continued for 12 to 14 in. and is made between the midline and the right subcutaneous abdominal vein.

Handling and Incising the Uterus

When the incision through the abdominal wall has been completed, the surgeon is ready to bring the pregnant horn of the uterus to the incision. The uterus should be lifted gently to the incision if this is possible. This is done to prevent intestines from eviscerating and to allow uterine fluids to drain outside of the peritoneal cavity. There are some differences in the method used to bring the uterus to the incision. It varies according to the site employed.

From the left side of the abdominal wall, the rumen is pushed forward and perhaps upward to make room for the uterus.

On the right side, omentum lies just deep to the parietal peritoneum. If the arm is directed posteriorly to reach the edge of the omentum, it can be pushed forward and will then act as a shelf or curtain to hold intestines back from the incision. This is of less value in the lower abdominal approach. Some practitioners restrain animals in chutes and elevate the rear end of the apparatus. This elevates the posterior part of the patient and causes the intestines to roll forward. Sometimes it is necessary to incise the omentum. If so, it must be sutured before the abdominal wall is closed.

When the incision is on or near the midline, omentum usually has to be moved anteriorly to expose the uterus. The uterus is then brought to the incision and the posterior end of the cow or the whole cow is turned to lateral recumbency. This will allow the uterine fluids to drain outside of the peritoneal cavity.

Even if the uterus can not be brought into the incision in such a manner so that spillage into the peritoneal cavity can be prevented, the results need not always be fatal. Uterine contents that have not become contaminated do not materially increase operative mortality if they spill into the peritoneal cavity. They do however, increase the possibility of adhesions and thus affect the future reproductive ability of the dam. Contaminated uterine contents spilled in the peritoneal cavity immediately lay the ground-work for diffuse peritonitis.

When uterine torsion is present, it should be corrected before the uterus is incised. If the cervix is dilated, a cesarean section may not be necessary. Sometimes a torsion can not be corrected at this time. The uterus is then incised within the peritoneal cavity and the torsion corrected later. The incision in the uterus is made to follow the long axis of the uterine horn and in the anterior portion of the gravid horn. Usually either the front or hind feet of the fetus are the part which extends most anterior in the pregnant horn. A small incision is made between the cotyledons and is enlarged with a pair of scissors to avoid these structures. The incision should be large enough to permit passage of the fetus without tearing the uterine wall.

Removing the Fetus

The placenta is now pierced exposing the legs. When the uterine fluid stops gushing, legs are grasped and the assistant attaches obstetrical chains. If the front legs are presented, a snare or a chain is attached to the head. The fetus is now removed by traction in the direction most suited to the position and curvature of the calf.

If the calf is alive, the assistant removes the mucous from the mouth and nostrils and begins rubbing with a towel to stimulate respiration.

Handling of the Placenta

If the placenta can be removed easily, it is separated from the uterus and removed through the incision. A firmly attached placenta is trimmed with a pair of scissors to facilitate suturing and left in the uterus. Wright[3] of England reports that it is unlikely that the placenta can be removed at the time of surgery if the fetus is still alive. Uterine bolets are placed in the uterus before suturing.

Suturing of the Uterus

An infolding type of suture is used on the uterus. This brings the serosal surfaces together which heal readily. A modified Cushing or Lembert type of suture is used. A normal uterus that is contracting can safely be sutured with a single row of Guard's modified Cushing sutures. In suturing an abnormal appearing

or edematous uterus, as is often found in torsion of the organ, interrupted Lembert sutures probably are best. In these cases, there is great danger of sutures tearing out, which would contraindicate the use of a continuous suture. If one is uncertain about the closure, two rows of sutures should be used. The material used is no. 2 chromic catgut. Other materials can be used but catgut is superior in case of an infected uterus. It is absorbed by the body and will not serve as a focus of infection.

One million units of aqueous crystalline penicillin are now sprayed on the suture line. The uterus is placed in its normal position making certain that it is straight. If spillage into peritoneal cavity has occurred, this should be removed with sterile towels dampened with saline. If the spillage is contaminated, sulfamethazine solution is placed in the peritoneal cavity. If the uterus does not begin involuting by the time its suturing has been completed, an ecbolic should be given at the completion of surgery. Posterior pituitary extract or a similar product is used for this purpose.

Suturing the Abdominal Wall

Many types of closure have been used on the abdominal wall and most of them have been accompanied with good results. Particular care must be taken in suturing the lower abdominal wall and the midline incisions to prevent wound dehiscence and herniation.

The methods of suturing which best fulfill the principles of good surgery and likewise are accompanied by the least number of complications are described below.

Upper and Middle Abdominal Wall. The peritoneum and the fascia adhering to it are sutured with no. 2 chromic catgut using a simple continuous type of suture. The rest of the wall, with the exception of the skin, is closed with a simple continuous suture of no. 3 or 4 chromic catgut. If tension is necessary to pull the edges of the incision together, a lock stitch or interrupted type of suture should be used. The skin is then closed with interrupted mattress sutures of silk or similar material.

Lower Abdominal Incision. The peritoneum is closed as described for the upper and middle abdominal incisions. The muscle layers must be brought into apposition carefully, making certain that the muscle fascia is included. If muscles lend themselves to it, they are sutured individually with no. 2 or 3 chromic catgut. The skin is sutured as described above.

Incisions Near or on the Midline. The animal is usually turned to dorsal recumbency for suturing the abdominal wall. This reduces the danger of evisceration. Some surgeons use the through and through type of stitch using suture tape.

A safer method is the use of synthetic material or no. 4 chromic catgut in the peritoneum. Abdominal tunic and the rectus abdominus muscle are sutured as one unit with synthetic suture material. Interrupted or simple continuous type of suture is used, the skin is sutured separately with the same material.

In closing incisions directly on the midline the peritoneum and linea alba should be sutured with synthetic material. Interrupted sutures are placed in the skin.

Postoperative Care

Patients which are operated promptly after onset of labor and are in good condition at the completion of surgery are given 3,000,000 units of procaine penicillin in oil intramuscularly. If the placenta was not removed at the time of surgery, the animal should be observed to see whether these tissues pass normally. Cases of retained placenta with accompanying metritis and which have an open cervix are treated as a case of metritis not associated with cesarean section. Estrogens are used in an animal in which the cervix is not dilated in an attempt to aid in its dilation and thus permit passage of the placenta and the fluids in the uterus through the cervix.

Animals in poor condition or in which the peritoneal cavity has become contaminated must be sustained on sulfonamides or antibiotics and given parenteral fluids. Fluids used commonly in supportive therapy are blood, dextrose, and saline, either alone or in combinations.

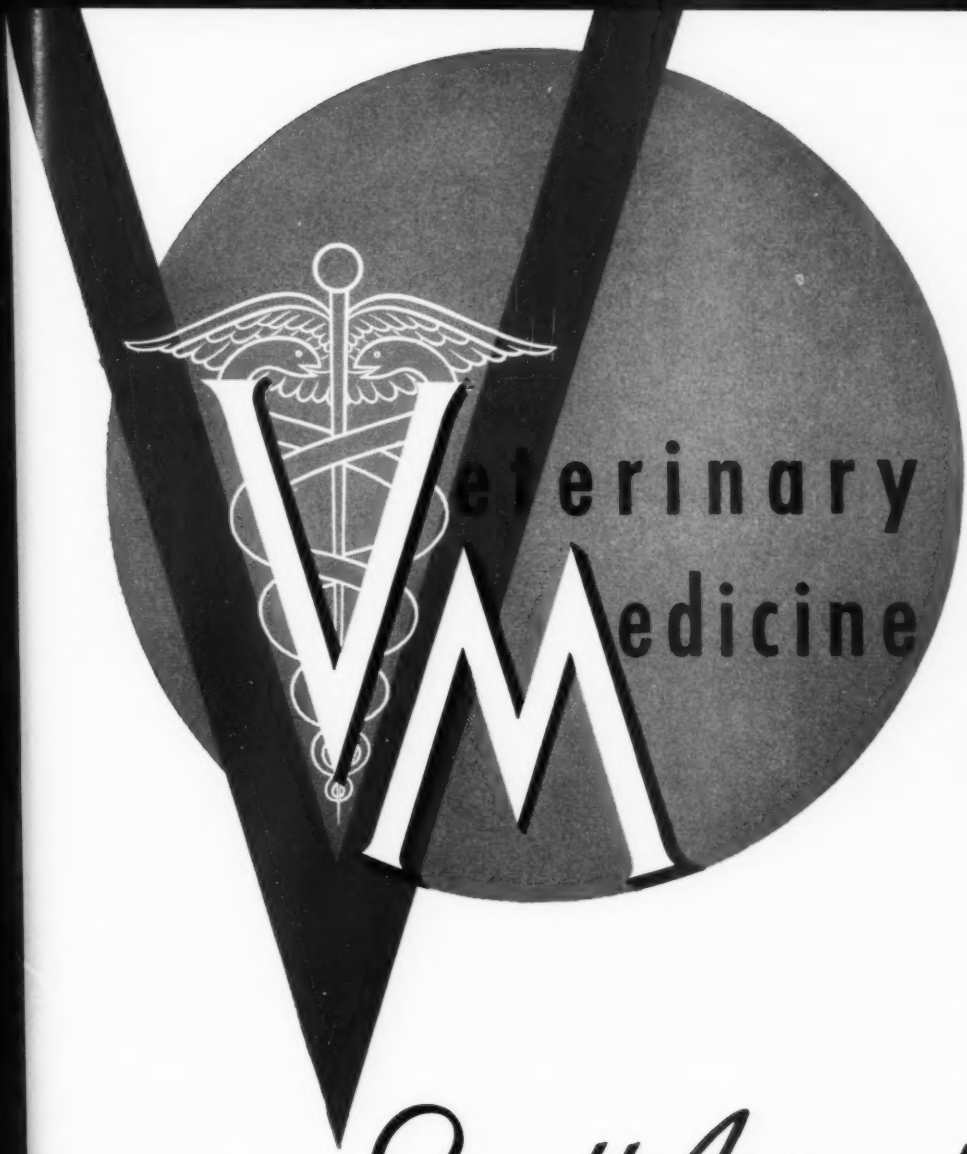
The skin sutures are removed in ten days to two weeks. If the course has been a stormy one, tissues heal slowly in which event sutures should remain in place as long as three weeks.

Conclusions

Cesarean section is a procedure well within the capability of any practitioner. It provides a method of handling dystocias which are difficult or impossible to deliver by other means.

It must, however, be remembered that cesarean section is not a last-resort operation.

(Continued on page 460)



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Skin Manifestations Of Internal Disorders†

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THE skin is mirror-like, reflecting internal health or disease. Internal disorders or anomalies are frequently associated with skin lesions, and may be reflected by skin manifestation in specific areas. For instance, kidney disorders are thought to produce skin lesions on the region of the back. Disorders of the liver appear to be associated with lesions in the neck region. Endocrine disorders may be characterized by skin lesions which vary according to the type of imbalance.

As with any disease, the most important point of rational treatment in dermatological conditions is correct diagnosis, particularly an etiological diagnosis. Skin disorders which are associated with internal disease may either be hereditary or may be associated with hereditary predisposition. Hereditary skin conditions are often found in certain species or in certain breeds within a species. Some skin diseases of internal origin occur only in special age or sex groups. Other predisposing factors which may result in cutaneous manifestations are season of the year, climate, environment, et cetera.

Acquired internal disease is perhaps the most frequent cause of skin pathology, particularly in the dog and cat. For example, eczematous skin lesions have been observed in association with chronic interstitial nephritis, chronic hepatitis, pyometra, and in the course of prostate and anal gland disorders. (Fig. 1).

Deficient nutrition particularly protein, fat, vitamin, mineral, and trace element deficiencies, may be primary etiological factors in the development of stubborn generalized skin lesions.

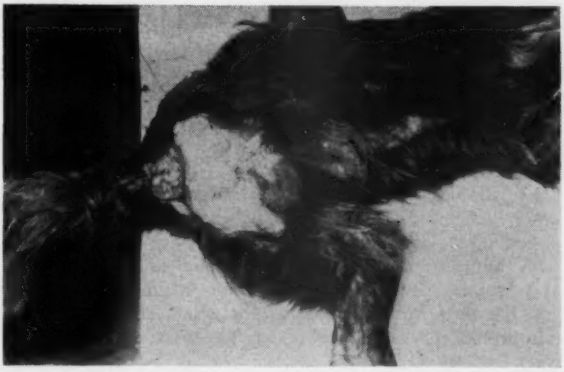

Fig. 1. Squamous, crusted eczema in the course of a chronic anal gland disorder.

†Presented at the 73rd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 16-18, 1957.

*Professor of Veterinary Medicine, University of Pennsylvania.

Fig. 2. Hypoestrogenism observed after spaying at an early age.

Hormonal Imbalance

An important cause of eczematous skin disease may occur in small animals in conjunction with hormonal imbalance. Either deficient or excessive activity by various endocrine glands may result in severe eczematous skin lesions. Disorders in gonadal activity in both sexes is particularly important. For example, scleroderma and allergic dermatoses have been observed in association with deficient activity of the gonads. In female dogs these conditions have been observed most frequently after spaying, particularly when spayed at an early age before development of the first heat cycle. (Fig. 2). Visible disturbances in the estrous cycle may also be associated with severe skin disease. The lesions start with loss of hair on the posterior part of the adomen, between the hind legs, and around the anus and vulva. Squamous, crusted eruptions develop soon after. These lesions are symmetrically distributed and, in advanced cases, the dry eczematous lesions spread to other parts of the body surface.

Dermatoses have been observed in male dogs with insufficiently developed testicles, in the course of testicular atrophy, and especially in connection with tumors of the testicles. Sertoli cell tumors which are associated with production of large amounts of estrogen are, as a rule, the cause of special skin lesions characterized by a symmetrical hair loss, hyperpigmentation, and gynecomastia. Sertoli cell tumors often develop in retained testicles and may reach a large size. The management of hypogonadism is based on replacement therapy with appropriate hormones. Because males and females produce a special ratio of male and female hormone, preparations which contain both diethylstibesterol and testosterone are often indicated.

In dermatoses associated with excessive production of estrogen, as in cases of cystic ovaries, ovariectomy appears to be the most effective treatment. In dogs suffering from Sertoli cell tumors, castration is recommended.

Hypothyroidism is frequently observed in dogs and results in alterations in their general condition and in the skin. In the early stages, loss of hair occurs on the back and on the abdominal region. (Fig. 3). Alopecia may be

Fig. 3. Alopecia caused by hypothyroidism.

diffuse or scattered. Myxedema of the skin of the neck and back has been observed and striking adiposity may follow. In advanced cases, hyperkeratotic skin lesions or scleroderma are noted. (Fig. 4).

Treatment of cutaneous lesions resulting from hypothyroidism may be effective, particularly in cases in which hyperkeratotic skin lesions have not yet developed. Thyroid hormones may be administered orally in 60 to 180 mg. daily doses for 28 days. This medication should be repeated in four to six weeks, or in several months, depending on the severity of the thyroid disorder.

Skin manifestations associated with disorders in the production of adrenocorticotropic hormone are also observed. These conditions may result from tumors of the anterior lobe of the pituitary gland. Skin lesions are characterized by loss of hair, especially on both sides of the trunk and sometimes by an increased pigmentation of the skin.

Deficient production of adrenal cortical hormones may cause primary skin disease. The most significant symptom is pruritus and an increased pigmentation of the skin, especially on the posterior part of the abdomen. (Fig. 5.) This hyperpigmentation may be diffuse or scattered. In advanced cases of hypocorticoidism, sclerodermatous lesions may also show increased pigmentation.

In early cases of hyperfunction of the adrenal cortex in dogs (Cushing's disease), alopecia on areas of contact or friction has been observed. Later, small pustules or blisters develop on the abdomen with desquamation and hyperpigmentation. These cases are not common.

The treatment of hypocorticoidism is relatively effective when cortisone preparations are administered systemically and topically. Dosage should be regulated according to the extent and severity of the skin lesions and according to the weight of the affected animal.

Finally, I would like to mention skin manifestations associated with disorders of the endocrine secretions of the pancreas. The cutaneous disturbances are chiefly characterized by severe pruritus and dry eczematous eruptions. Insulin injections are the best systemic treatment.

Allergy and Anaphylaxis

Allergy and anaphylaxis may be discussed with the internal factors involved in the development of skin disease. Such lesions develop

Fig. 4. Long lasting hypothyroidism. Scleroderma.

Fig. 5. Hyperpigmentation over the abdomen in the course of hypocorticoidism. This condition can be treated effectively with corticosteriods.

frequently in dogs and cats, being caused by various foods, systemically or locally applied proteins, vaccines, antibiotics, chemicals, internal and external parasites, and many other substances. It is usually difficult to identify the offending agent. There are certain predisposing conditions which facilitate the production of allergic skin conditions by the aforementioned agents. For example, allergic dermatoses develop most frequently in certain breeds, under special environmental conditions, and during special seasons of the year. Endocrine imbalance and various metabolic disorders are thought to be important in predisposing to the development of skin allergies.

In dogs and cats, excessive feeding of horse meat, canned food preserved by benzoic acid, eggs, cow's milk, fish or fish meal, and many other foods may produce severe allergic skin disease over the entire body surface.

Topical allergies in dogs and cats caused by plants, chemical dust, and especially by external parasites such as fleas, lice, ticks, and sarcoptic mites are common in the summer and fall. In short-haired dogs even vaseline and lanolin may produce severe hypersensitivity and skin eruptions.

Allergic dermatoses are recognized clinically in several ways. As a rule, they develop suddenly or within a relatively short period. (Fig. 6). The animals are itchy and small papules, large wheals or edematous swellings develop on various parts of the body surface. In severe cases, blisters and pustules are noted. They soon rupture, forming squamous-crusted lesions. Occasionally severe pyogenic skin inflammations result from secondary infection during scratching.

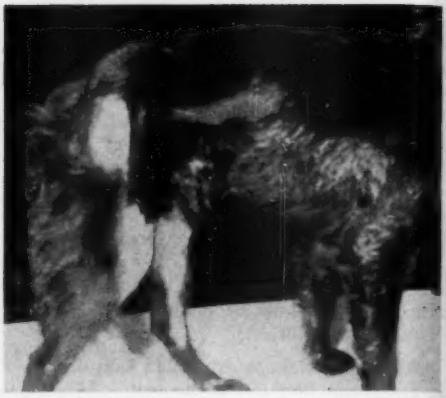

Fig. 7. Loss of hairs in the course of a mild thallium poisoning.

Antihistamines are indicated in allergic dermatoses in which histamine is primarily responsible. Otherwise, cortisone preparations are most effective. If the primary cause of the allergy is known, it should be removed as the first step in any treatment.

Intoxication

Skin disorders of internal origin have been noted in the course of various intoxications. For example, thallium poisoning caused by commercial rat poisons containing thallium sulfate has been found as a frequent cause of severe dermatoses in dogs. In cases of mild thallium poisoning, loss of hair may develop all over the body surface. (Fig. 7). In severe poisoning, erythematous lesions develop between the digits, on the lips, and on the abdomen.

Fig. 6. Allergic wheals in a horse caused by eating wild oats.

Ergot poisoning is another type of internal disorder associated with skin manifestations. It is characterized by necrosis which develops mainly on the peripheral parts of the body, particularly on the ears, toes, and on the tail. Mortified edges of the ears, tail, and sometimes even whole toes may fall off.

There is no specific treatment for these toxic dermatoses. Symptomatic treatment of the skin lesions is indicated.

For the topical treatment of the dermatoses of internal origin various external agents may be used. The selection of the proper drug is often a difficult task. There is no skin remedy or dermatologic nostrum which can be applied successfully to all types of skin lesions. In the selection of topical skin preparations one should consider the type of eruption.

What I have presented here on skin manifestations of internal disorders is largely based upon clinical observation. Unfortunately, the state of our present knowledge does not permit more definitive discussion.

▼ ▼ ▼

Heartworms in the Midwest

R. M. STONE, D.V.M., Detroit, Michigan

Heartworms are found infrequently in this locality. As in the case in the following report, there is usually a history of previous visits to the South. With the exception of the cough, which is often found in obese, adult dogs in this area, there are few other symptoms specifically indicating heartworm infection.

Case Report

Fox Terrier, spayed female, five years of age. General condition, obese.

History. Born in Savannah, Ga., and brought to Michigan at one year of age. Return visits to the South in July 1956 for three weeks and four weeks in November of 1956. Previous to these periods, the patient was treated in October 1955 for gastroenteritis and in February 1956 for tonsillitis. Uneventful recovery followed routine treatment in both incidents.

In October 1956, the patient was treated for an upper respiratory infection and was reported in good condition one week later. On Feb. 21, 1957 the dog was presented with a history of anorexia of 48 hours duration, vomiting, hematuria, and slight icterus. Temperature was noted at 102.5 F. Bowel evacuations were normal. Abdominal palpation revealed an enlarged ventral mass believed to be a splenomegaly. A tentative diagnosis of leptospirosis was made. Pertinent therapy was initiated and carried out by the client. The patient was returned in 48 hours displaying incoordination, temperature of 103 F., abdomen distended, tender on palpation and all visible mucous membranes and skin heavily jaundiced. Death occurred the following day.

Autopsy Findings

Gross Pathology. Tissue bile stained throughout, serosanguineous fluid in abdomen and thoracic cavity, liver enlarged and nutmeg in appearance. Gallbladder distended. Heart enlarged, flaccid, and hundreds of *Dirofilaria immitis* in pulmonary artery, aorta, and right side of the heart.

Heartworms removed from Fox Terrier.

Microscopic Pathology. Marked passive congestion, marked increase of connective tissue, and numerous microfilaria.

The writer believes that if more complete autopsies were performed on suspected leptospirosis cases, or those classified as chronic cardiac and bronchial cases, reported incidence of heartworm infection in the Midwest and adjacent areas would be greater than now believed probable.

▼ ▼ ▼

Tularemia

Four cases of tularemia are reported by the Colorado State Deparment of Health among workers in small plants in the state engaged in processing wild rabbits. Rabbits are collected, then skinned and processed; meat is frozen and sold to small animal food processors and skins are baled for processing plants.

A Safer Technic For The Induction Of General Anesthesia In Small Animals

LEONARD KRAWITZ, V.M.D., Philadelphia, Pennsylvania

A major problem in routine surgical programming is the safe induction and maintenance of the patient in a satisfactory plane of anesthesia. The difference between the effective anesthetic dose and toxic dose of any barbiturate leaves a small margin of safety, and there has been a continuing search for an agent to increase the therapeutic index of these drugs. Belladonna and phenothiazine derivatives are used as preanesthetic agents but, in each case some degree of unwanted action may be induced. These compounds are considered desirable because of their selective ability to allay apprehension, depress parasympathetic reflexes and diminish secretory activity of organs.

One of the primary objectives in the use of preanesthetic agents is to reduce the quantity of anesthesia required. The need for this arises from two major factors in veterinary anesthesia. The first is that renal efficiency and hepatic function regulate the rapidity of the metabolic breakdown or excretion of the barbiturate. The survival of the patient from anesthesia depends upon the functional efficiency of its organs. Many patients, projected into plane one of stage three anesthesia, will be slow to recover due to the amount of barbiturate present, and the poor excretion or detoxication of the drug. These poor anesthetic risks are recognized too late.

In contrast are those patients whose recovery from surgical anesthesia is too rapid. These patients invariably show pain reflex before completion of surgery. To give additional barbiturate at this stage would be dangerous, and frequently may be fatal, since barbiturates tend to accumulate in the body. Thus an additional dose of barbiturate may easily put the patient into a depth of anesthesia where recovery is extremely slow or impossible.

In order to overcome these major problems to safe general anesthesia, any procedure which would potentiate anesthetic action of barbitturates, thus reducing the total dosage and effectively calm the patient while in a light plane of anesthesia, would be desirable.

Promazine hydrochloride (sparine,® Wyeth) one of the newer group of so-called tranquilizer or ataractic drugs has been found to be effective and have certain desirable features as a preanesthetic prior to barbiturate anesthesia. No undesirable or dangerous side effects have been observed in its use. The action of the barbiturates is primarily focused on the cerebral cortex. In doses large enough to control agitation, the drug will completely narcotize the patient who is then helpless. Larger doses inhibit the respiratory center in the medulla, and may cause death. The action of promazine hydrochloride is thought to be in the reticular formations and as such it controls the impulse which may arise in the upper brain. The action of these two drugs in combination tends to control autonomic nervous function.

Technic of Administration

The technic as applied to dogs and cats is as follows: The patient is weighed, and three-fourths of the recommended dose of barbiturate of choice is drawn into a syringe. (Aged patients should be limited to two-thirds of the estimated dose,) A *separate* syringe is loaded with promazine, using a dose of 1.5 to 2.0 mg. per lb. of body weight. The first half volume of the barbiturate is injected intravenously at the rate of 1.0 cc. per five seconds. The last half is given slowly, taking care that the patient is narcotized but not free of reflex action and that the patient does not pass beyond plane one of stage three anesthesia. At this plane the pedal reflex disappears but the corneal reflex is still present. Respiration is still thoracic, at the rate of 16 to 20 per minute. This plane is light anesthesia. The syringe is disconnected from the needle leaving the needle in place in the vein and the syringe containing the promazine is connected. This should be given slowly, but to completion in 30-45 seconds. The patient will pass directly to surgical anesthesia, generally described as plane three anesthesia. A brief period of apnea may occasionally appear at this point but should cause no concern.

TABLE 1.

No. Patients	Type & Dose of Anesthetic	Dose of Sparine	Diagnosis	Remarks
3	Pentothal-usual dose	1.5 mg./lb. I.V. after induction of anesthesia	Strontium 90 therapy	Pentothal alone does not last long enough. When sparine is used, anesthetic effects may last one hour
8	Pentobarbital ¾ gr./5 lb. body wt.	"	Ocular (cataracts, lamellar keratectomy, etc.)	Stage of anesthesia good and lasts for 45 to 60 min. Recovery smooth and quiet
1	"	"	Cystic calculi	"
2	"	"	Neoplasm	"
1	"	"	Hernia	"
4	"	"	Reduction of fractures and/or dislocations	Recovery excellent. No period of excitement, crying efforts to stand, etc.
4	Pentobarbital ½ gr./5 lb. body wt.	"	*X*-ray exam	All suitably relaxed and easily handled. They were asleep and could be positioned without resistence. Reflexes still present
8	Pentobarbital ¾ gr./5 lb. body wt.	"	Spay	Maintained throughout surgery in good plane of anesthesia
2	Pentobarbital 1 gr./5 lb. body wt.	3 mg./lb. I.M.	Ocular	Sparine used postoperatively to quiet patient during recovery from anesthetic. Results excellent
4	"	2 mg./lb. I.V.	"	"
1	Methadon HCl	3 mg./lb. I.V.	Dental	Patient was poor anesthetic risk. Sparine with methadon much more effective than methadon alone
3	None	2 mg./lb. I.V.	Eczematous lesion on tail	Patient ceased to molest lesion
1	"	3 mg./lb. I.M.	Very nervous, coat badly matted	Very quiet 30 min. after sparine injection. One man able to trim
1	Local infiltration 2% procaine HCl	6 mg./lb. I.V.	Minor cutaneous surgery (neoplasm). Patient difficult to handle	Patient relaxed within 5 min. 20 min. later growth removed without difficulty
1	None	4 mg./lb. I.V. daily for 12 days	Myositis (cervical)	Relief of pain was dramatic. After sparine the head and neck could be moved through any motion without evidence of pain
1	Demerol® 5 mg. Pentobarbital 1 gr./10 lb. Tracheal intubation (light ether)	1.5 mg./lb. I.V.	Mammary carcinoma	Patient handled in light anesthesia until after surgery. Sparine given at recovery for quieting effects. Recovery smooth
1	(Feline) None	5 mg./lb. I.V.	Ear cleaning	Patient resented handling. After sparine resistance was mild
6	None	2 to 4 mg./lb. I.M.	Hyperexcitable patients. Submitted for minor manipulations	Patients were either vicious, excited, or resented handling. Immediate effect; patients lay quietly and were gentle
1	(Feline) None	3 mg./lb. I.M.	Hyperexcitable patient eczema bath	Patient could be handled quite easily by one man
2	(Feline) Pentobarbital ¾ gr./5 lb.	2 mg./lb. I.V.	Spay	Excellent anesthesia

There appear to be several outstanding points which are favorable to this technic. While the reflex actions, which are used as a guide and an indication as to the stage of anesthesia, are somewhat slowed, they are still present. However, the pain reflex as evidenced by whining, crying, abdominal press, et cetera, is absent, along with any evidence of hyperexcitability. This enables the surgeon to obtain satisfactory anesthesia with a safer dose of barbiturate, encompassing the features of general anesthesia.

Promazine potentiates the effects of barbiturates maintaining adequate surgical anesthesia for longer periods even when barbiturates are used at lowered dose levels. It has been found that an effective stage of surgical anesthesia may be induced when promazine is given to patients in lighter induction stages of anesthesia. If the patient begins recovery too soon, a second injection of promazine at the same dosage as previously described is given either intravenously or intramuscularly. This is sufficient to induce surgical repose and effect control of the patient until surgery is complete. As the action of the barbiturate is of shorter duration than that of promazine, the patient is usually free of the effects of the barbiturate before the effects of promazine have vanished. For this reason recoveries are smooth and uneventful. Patients do not mutilate sutures, bandages, or pressurize tissue made friable by surgery. The types of surgical procedures used under this method of anesthesia are shown in table1. It will be noted that several surgical procedures for cataract extraction were done under this technic. Palpebral pressure while recovering from this surgical procedure many times destroys the effects of surgery.

None of the patients under this technic gave any evidence of squinting or pressure on the surgical area. This may be attributed to the action of the promazine in producing a quieter recovery period.

▾ ▾ ▾

"When a rabid dog is loose in a Russian community," stated *New York Times* Russian correspondent Harrison Salisbury, "a committee with rifles may systematically liquidate every dog in sight." Salisbury said he witnessed one such dog hunt near Moscow.

▾ ▾ ▾

Future historians will likely refer to the 20th century as the age of research.

Interference Phenomenon of Rabies Antiserum and Vaccine

The Third Report of the World Health Organization (WHO) Committee on Rabies (Jan. 1957) suggests that rabies antiserum may interfere with efficacy of rabies vaccine in man.

Recent investigations appear to establish that: (1) Antibody response to phenolized tissue vaccine was less with three doses at five-day intervals than with 14 daily doses; (2) one or two doses of antiserum almost completely suppressed antibody response to the three-dose routine; and (3) one dose of antiserum reduced, and two doses at five-day intervals suppressed, antibody response to 15 daily doses of vaccine.

With three doses of high egg passage (HEP) Flury vaccine administered five days apart, there was little antibody response when given intradermally but treated individuals responded promptly to a later booster dose of the same vaccine; however, one or two doses of antiserum completely suppressed the antibody response and there was no measurable response to a later booster dose.

It has been recommended that severely exposed individuals (man) be given a single dose of antiserum followed by 14 or more daily doses of vaccine.

Work was also reported indicating that puppies under three months of age usually were incapable of developing protective immunity to any rabies vaccine and in rare cases succumbed even to low egg passage (LEP) Flury strain. These vaccines protect adult cats but the nerve tissue vaccine appeared to induce a significantly greater protection. Kittens may also be protected by vaccination with LEP Flury vaccine but occasionally one less than four months of age will succumb to it. That LEP Flury vaccine which is safely used in adult dogs has been shown to be hazardous to adult foxes, skunks, and cattle.

The Expert Committee on Rabies (WHO) states that susceptible dogs and cats known to be bitten by a rabid animal should be immediately destroyed. If not destroyed such animals should be isolated for six months and treated with rabies antiserum (0.5 ml./kg.) followed by one-to-three doses of chick-embryo vaccine in seven days, or 14 daily doses of the phenolized nerve tissue product. If considered protected by previous vaccination, animals bitten by rabid animals should be revaccinated, confined and isolated for 30 days.

Some Clinical Problems In Small Animal Practice†

J. E. MOSIER,* D.V.M., M.S., Manhattan, Kansas

MEDICAL management of problem cases challenges the clinician and stimulates all possible investigation and inquiry. A few of these problems, presented almost daily in small animal practice, will be discussed with particular reference to current methods of handling them.

"Hard Pad" Disease

I believe, as do many veterinarians, that hard pad disease is a chronic form of distemper. We explain it on the basis of relative immunity and virus localization. It is postulated that affected animals have a degree of acquired or natural immunity sufficient to prevent the development of acute distemper, yet the immunity is not sufficient to overcome the virus before it localizes in susceptible cells such as those of the epithelium. It is suggested that the virus localizes near the germinal layer of the epithelium and that its presence allows infection of new cells as they are formed yet does not cause systemic reaction sufficient to produce general immunity. As a result, there is an irritant effect on the epithelium which accentuates the formation of new cells. This results is desquamation over most of the body surface and is particularly noticeable on the inner surface of thighs. In some areas, such as the foot pads, and on the nose, desquamation does not occur and the end result is the thickened hyperkeratotic epithelial layer which provides the basis for the term "hard pad" disease.

Treatment with virulent virus has given best results to date. For this method of treatment the virulent hypering virus used in the production of distemper antiserum has proved most successful. Since hypering virus is not readily available we have substituted blood from acute cases of distemper, thought to be in the viremic stages of the disease, with good results. In cases where neither of these sources of virulent virus are available we have used the modified vaccines (ferret or chick embryo). Results with the vaccines have, in our opinion, been less satisfactory then with the more potent virus material.

Usually two injections of virulent virus given intravenously at three-day intervals will suffice, although we have given as high as four injections. If successful, the temperature which usually ranges from 103 to 104 F. will drop to normal in three to five days. The use of virulent virus will occasionally produce a hemorrhagic enteritis of short duration, but as the temperature drops to normal the patient begins to regain appetite and gradual improvement is noticeable. Within five to seven days the thickened epithelial layer of the foot pads will usually slough, which may be considered a favorable sign for prognosticating the course of the disease. Supportive treatment with blood transfusions, B-complex vitamins, antibiotics, and good nursing is an essential adjunct to the virus treatment of hard pad disease. The owner should be advised that if convulsions do not occur within ten days following the first injection, then the chances of success are fairly good.

Our results using virulent virus have been about 50%. Even at best the period of recovery is quite prolonged and the patient will require careful nursing.

Results of the virus treatment reported by Woodward (75%) and Nijeland (80%) have given a larger percentage of cures than we have experienced. Even so, we have saved a higher percentage of our hard pad cases with the use of virulent virus than with other methods of treatment such as ACTH, B-12, cortisone, etc.

Puppy Septicemia

Occasionally one is confronted with a case in which puppies three days to a week of age suddenly become sick and die after two to 18 hours of illness. A history of sudden illness associated with symptoms of abdominal distention, rapid respirations, crying as if in pain, cold and clammy to touch, is followed by coma and death. In the usual case one puppy becomes ill, then within 12 to 24 hours a second sickens and so on until all the members of a single litter are affected. Necropsy of an

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†Presented at the 73rd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 16-18, 1957.

*Professor of Small Animal Medicine and Surgery, Kansas State College, School of Veterinary Medicine.

affected puppy reveals gas distended intestines, a severe enteritis in anterior portions of the bowel, and congestion of the lungs. Culture of heart blood of puppies near death or recently deceased reveals the causative bacterium. *E. coli* has been incriminated in the majority of cases we have observed. Other organisms that have been isolated include Pseudomonas and streptococcus. In all cases to date the cultures have been pure and no evidence of dual infection has been noted.

This condition is occasionally referred to as acid milk, and too frequently, is lightly regarded as a case in which the milk of the bitch does not appear to agree with the puppies. Actually it is an acute puppy septicemia comparable to infant diarrhea. In a few cases, we have found one or more of the mammary glands of nursing bitches secreting abnormal milk and on culture organisms were found to be identical to those recovered from affected puppies. The possibility of endometritis in the bitch should be thoroughly investigated in all cases.

Treatment is highly successful in most cases. The use of chloramphenical (chloromycetin)®[1] palmitate orally or streptomycin parenterally will stop death loss within 18 hours after initial treatment. It has been our practice to treat affected puppies for four to five days with antibiotics.

Pyogenic Dermatitis

This is a distinct disease entity of puppies which may be quite resistant to treatment. Infection is first noted involving hair follicles of the face and may spread back on to the neck and shoulders. The regional lymph nodes may become enlarged and if the infection developes glands will ulcerate. In older pups infection appears to be more subcutaneous and may give the appearance of multiple boils with fistula formation from the regional lymph nodes.

Several puppies of a litter may be affected but usually not all of them. Advanced cases may die of toxemia due to the absorption of toxins from extensive lesions.

Cultures of the affected areas will usually reveal a staphylococcus, and which may be quite resistant to sulfonamides, and most antibiotics. The possibility of viral etiology is being investigated in Europe.

Treatment with staphloccoccus toxoid, novobiocin and foreign protein has yielded good results in our cases. Good nursing and supportive therapy are essential for rapid recoveries.

Some veterinarians have reported success with intravenous sulfamethazine, but our results with other sulfonamides have not been particularly successful.

Feline Exudative Pleurisy

While this is not a common condition, it has been observed frequently during recent years. Affected animals usually are presented with a history of anorexia and listlessness of several days duration and difficult breathing. The position of lying on the sternum with forepaws extended is characteristic. Affected animals may cry when picked up or when pressure is applied over the thorax. Others will become frantic if an attempt is made to turn them over on their side. Mouth breathing is a fairly common symptom and dyspnea is marked. Rectal temperature is normal or slightly elevated. Heart sounds may be muffled. A lateral radiograph may reveal a fluid line if taken with cat in standing position. In advanced cases anemia usually is present.

®[1]Parke-Davis & Co., Detroit, Mich.

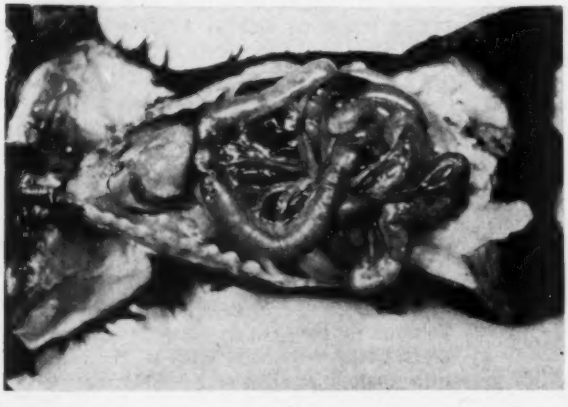

Fig. 1. Gas distended intestines usually observed on necropsy of puppies dying of septicemia.

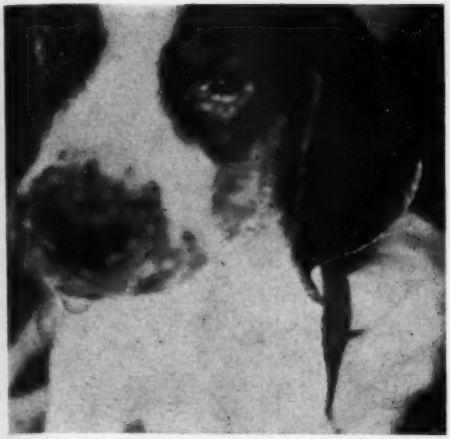

Fig. 2. An early case of pyogenic dermatitis.

Intensity of symptoms is directly dependent on the amount of fluid in the pleural cavity. These result from pressure on the lungs due to the fluid interfering with the distendibility of the lung tissue with resultant collapse.

Treatment consists of aspiration of the fluid from the thorax and injection of antibiotics plus streptokinase or streptodornase directly into the pleural cavity to combat the possible infection and to liquify exudates. Daily treatment in this manner plus systemic antibiotic treatment has been successful.

The fluid may be sterile or septic. We have isolated *E. coli*, streptococcus, and staphylococcus from clinic cases. Two cases have apparently been the result of foreign bodies (cedar twig, grass awn) and the others apparently were extension of pneumonia, or pneumonitis. In three cases exudate was sterile.

Wilkinson reported on six cases in *The Veterinary Record* (July 14; 1956). Three yielded negative cultures. Aleurostrongyles were suspected in two cases and influenza in one case as contributing to the development of the condition. In the cases where the exudate was septic, Wilkinson reported a streptococcus associated with pneumonia, staphylococcus and *E. coli* with bronchopneumonia, and staphylococcus in a cat that had a history of coryza.

On necropsy, copious amounts of exudate filling one or both halves of the chest cavity were observed. The odor of exudates is usually offensive, are likely to be fibrinous and thick, but may be bloody or serofibrinous. In septic conditions lungs may be collapsed.

This syndrome is occasionally seen as an extension of pneumococcus infection of the lungs or associated with tuberculosis in man. Tubercles under the visceral pleura in patients who have become hypersensitive as evidenced by positive tuberculin reaction, may result in transudation of fluid into the serous sac (pleural effusion). In these cases the tubercule bacilli can not be detected in the fluid and it is sterile. We have also observed exudative pleurisy in dogs. In most of the canine cases observed in Kansas we have been able to recover staphlyococcus or *E. coli* from the exudate. Symptoms are similar to those of cats.

Coondog Paralysis

A flaccid paralysis of all four extremities of sudden onset has been described by Catcott and Kingma as Coonhound paralysis and by Brasmer and Schidler as pseudobotulism. It is a familiar entity in areas where coonhunting with dogs is a favorite sport.

Fig. 3. An advanced case of pyogenic dermatitis with ulceration of the prefemoral lymph glands.

It is not a recent entity as many veterinarians will recall seeing this condition years ago, particularly if they were in coonhound areas. Brasmer and Schidler prefer the term pseudobotulism because it not limited to coonhounds. We have observed it primarily in dogs from rural areas, mostly coondogs, also shepherds and farm type dogs.

In the early stages it is not unlike the entity formerly observed and called garbage poisoning in our town dogs, especially prior to the establishment of frequent garbage pickup service by city employees.

In early cases, gastrointestinal lavage may bring about recovery in a few dogs. But once

the animal has developed complete flaccid paralysis recovery period will be greatly prolonged. In our experience, four to six weeks is the average.

Treatment consist of nursing and good nutrition, adequate bedding with massage to avoid decubitus ulcers, maintenance of normal bowel and urinary function with B-complex vitamins is essential to recovery.

During recovery period, especially during the second and third week, the dog may become extremely sensitive to manipulation as if pain was quite severe. At this time, acetysalicylate or acetysalicylate and cortisone may alleviate the discomfort.

We have observed this condition to recur seven months apart in one dog. This would appear to support the statement made by Brasmer and Schidler that immunity is not produced.

In one instance the patient was a Spitz. The owner carried the dog in and after explaining the onset inquired as to where to take some chickens for diagnosis. The chickens were textbook examples of limberneck. In the few cases on which we have tried botulinum antitoxin, results have been no different than when the antitoxin was not used.

On the basis of our observations, we would agree with Brasmer and Schidler that the paralysis results from the ingestion of toxic substances probably from decaying carcasses.

The affected dog, if supported, will continue to eat and remain alert.

Follicular Balanoposthitis

Follicular balanoposthitis is a common condition among male dogs which has been referred to as gonorrhea of dogs or preputial dripping. It is characterized by a moderate to severe discharge of mucopurulent material from the prepuce. While not a serious health problem as far as the affected animal is concerned it does produce considerable irritation as evidenced by continual licking of the prepuce. Furthermore it is quite annoying to the owner of a household pet.

Cultures of the purulent material will usually reveal staphylococcus or streptococcus or occasionally Proteus as the predominent organism.

Local treatment with potassium permanganate, chlorine wash, and antibiotics have been disappointing in our experience.

Grasping the penis and retracting the prepuce will reveal considerable follicular development posterior to the glans penis. The follicles resemble those noted on the inner surface of the membrana nictitans in follicular conjunctivitis and because of the crypts formed they preclude successful treatment with local application.

Fig. 4. Tracheobronchitis.

Cauterization of the follicles with silver nitrate followed with a saline rinse and topical application of antibiotics will greatly increase the chances of successful treatment of this condition.

Tracheobronchitis

Tracheobronchitis of dogs variously referred to as kennel cough, tracheitis, chronic bronchitis, is a common problem of the small animal practitioner. The dry harsh cough which occurs in paroxysms followed by a retching or gagging motion is a familiar syndrome. The cough is easily induced by gentle pressure over the trachea.

While it is not a significant condition from the standpoint of mortality, nevertheless it does produce considerable discomfort for the affected animal and much concern to the pet owner.

We have observed it as frequently in pets having no contact with kennels as we have in kenneled animals. If for no other reason, this should be sufficient basis for the elimination of the term "kennel cough" from veterinary literature. While it is true that tracheobronchitis may upon occasion become a problem in veterinary hospitals and in kennels, the fact

(Continued on page 451)

Diseases Of The Orbit†

W. G. MAGRANE, D.V.M., M.Sc. (Med.)
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AFFECTIONS of the orbit include: (1) Congenital anomalies, (2) displacement of the eyeball (*i.e.* exophthalmos, enophthalmos), (3) cellulitis and periostitis, (4) ocular manifestations of disease of the nasal accessory sinuses, (5) tumors, and (6) injuries.

The most important signs of diseases of the orbit are exophthalmos (proptosis or protrusion of the eyeball from the orbit), and enophthalmos (recession of the eyeball into the orbit). There are, of course, many variations of the normal. Some eyes are naturally recessed, *e.g.* the Collie breed, while others naturally protrude, *e.g.* Pekingese, Pugs, et cetera. It is therefore, necessary to compare one eye with the other in the same animal, observing the eyes from front, side, and above.

Exophthalmos

Exophthalmos is by far of more frequent occurrence than enophthalmos. In exophthalmos the eye often appears to be larger or glaucomatous, but is not larger nor is there an increase in tension. In fact, the eye may well have a tension below normal. It is the widening of the palpebral fissure that affects this appearance.

There are three similar conditions of the orbit in which varying degrees of exophthalmos are exhibited. It is quite possible to confuse these, and with this confusion arrive at an incorrect diagnosis and a subsequent incorrect therapeutic procedure.

1. *Lid Abscesses.* May originate from an infection of the Meibomian glands in the lids. There is but a moderate degree of exophthalmos but the swelling is fluctuating and painful. This condition must be distinguished from a true orbital cellulitis (retrobulbar abscess). Treatment of lid abscesses consists of surgical drainage and curretage inside the lid and the instillation of an antibiotic ointment.

2. *Orbital Cellulitis (Retrobulbar Abscess).* (Fig. 1.) Characterized by swelling of the lids, chemosis, exophthalmos, impairment of mobility of the eyeball, violent pain when pressure is applied, and often an exhibition of extreme pain when an attempt is made to

Fig. 1. Orbital cellulitis (retrobulbar abcess).

Fig. 2. Direction of incision in drainage of retrobulbar abcess.

†Excerpts from slide-illustrated lecture presented at the 73rd annual meeting of the Indiana State Veterinary Medical Association, Indianapolis, January 16-18, 1957.

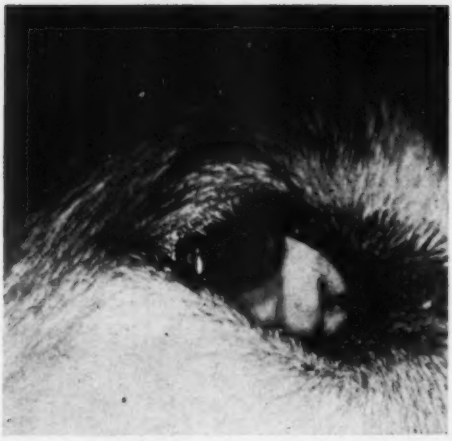

Fig. 3. Enophthalmos (recovered eosinophilic myositis).

open the dogs mouth. The etiology is obscure in many instances, but extension of disease of the nasal accessory sinuses must be considered. Treatment of retrobulbar abscesses consists of surgical drainage behind the last upper molar on the affected side and systemic antibiotics. (Fig. 2.)

3. *Eosinophilic Myositis.* (Fig. 3.) Less common, but strikingly similar in many respects to retrobulbar abscesses. This disease terminates fatally in many instances. The bloods picture reveals an increase in eosinophil count and the disease presents a characteristic clinical picture. There is symmetrical swelling of the masseter, temporalis, and pterygoid muscles, a variable degree of exophthalmos, edematous eyelids, hypertrophied and exposed membrane nictitans, and the mouth may be held open slightly. Whereas the jaw of a dog suffering from orbital cellulitis can be opened in spite of the pain evidenced, in eosinophilic myositis it is impossible to open the jaw to its fullest even when the animal is placed under deep general anesthesia.

According to Winter and Stephenson,[3] the enlarged pterygoid and temporalis muscles press on the retrobulbar tissue and cause the exophthalmos. Antibiotic therapy has always failed to alter the course of this disease, which usually lasts from ten to 21 days or with the death of the animal. The swelling of the muscles is followed by marked atrophy and fibrosis in the recovered patient. Harding and Owen[4] found ACTH and cortisone to be promising therapeutic agents in the treatment of eosinophilic myositis and one case treated in like manner responded beautifully for us.

There are other possible causes for exophthalmos, *e.g.* retrobulbar tumors, but they are of infrequent occurrence. Fig. 4* illustrates a case of neurogenic sarcoma causing extreme exophthalmos and blindness in a nine-year-old male Boxer. Symptoms included asymmetry of the head, sunken over the left temporalis muscle, protrusion of the left eye from the orbit, cloudy cornea with loss of the superficial layer, and crater-like formations with rough edges. The palpebral conjunctiva protruded as a reddish fold.

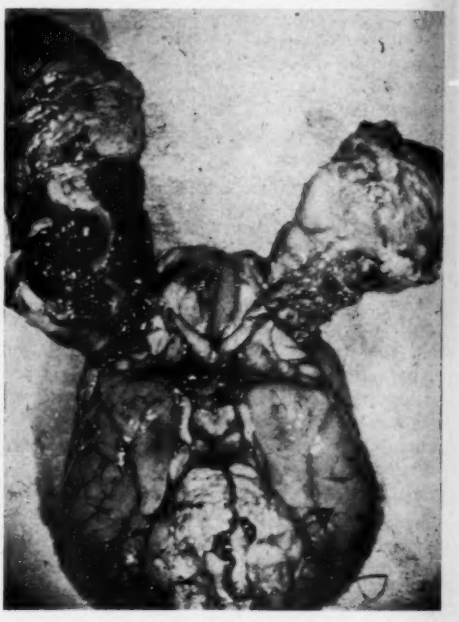

Fig. 4. Postorbital neurogenic sarcoma (left).

Enophthalmos

In enophthalmos, the eye appears smaller, but is not necessarily. It is the narrowing of the palpebral fissure that effects this appearance. While not as common as exophthalmos, there are a number of possible causes. Following trauma or surgery of the orbit, orbital fat may absorb, thus allowing the eye to sink back. Hematoma of the orbit may encapsulate, slowly absorb and then result in an enophthalmos. Cicatrical contraction following orbital injuries and cellulitis may cause a recession of the eyeball.

*Courtesy of Dr. John T. McGrath, School of Veterinary Medicine, University of Pennsylvania.

Enophthalmos is a possibility in the dog recovered from eosinophilic myositis due to the atrophy of the surrounding muscles and postorbital fat. Phthisis bulbi, a shrunken fibrotic globe as a sequal to panophthalmitis, invariably produces an enophthalmos.

Fig. 5. Bilateral anaphthalmos.

Reduction in size of the eyeball due to congenital microphthalmus (small eye) is another cause, and anophthalmos, in which the eyeball is replaced by a small solid cystic mass is still another. (Fig. 5.)

The possible effects of enophthalmos include: (1) Epiphora (excess tearing) because the puncti are no longer in the proper position to drain the tears, (2) Some alteration in overall vision because of the muscle imbalance which occurs, (3) corneal drying because the lids are not in approximation with, and thus able to wipe the cornea.

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2. Harding, H. P., and Owen, L. N., Eosinophilic Myositis in the Dog. *Jour. Comp. Path. and Ther.* 66:109, 1956.

▼ ▼ ▼

There are over 2,000 small animal hospitals and clinics in the United States.

Selection of Dogs for Nutritional Research

Several large companies have found that it costs about the same to use specially raised registered dogs for research in canine nutrition as it does to use stray mongrels, according to McCoy (*Bul. Med. Res.*, 11:4 [May-June], 1957). Healthy purebred puppies, immunized and ready for experiments, cost $50. to $100. each. To those persons used to research requiring only mongrels, diseased or not, this cost appears excessive. However, the cost of conditioning scrub animals can raise the cost to the level of purebred dogs. Registration of dogs costs $1. per litter and $2. per pup. Litter registration in the American Kennel Club is sufficient unless puppies are to be sold.

Beagles and Cocker Spaniels are useful breeds for research because they seem to get adequate exercise in small pens. Cocker Spaniels are often less gentle than Beagles but may be more useful in nutrition experiments because they tend to be heavier eaters.

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Some Clinical Problems in Small Animal Practice

(Continued from page 448)

remains that it is not always to be associated with dogs recently hospitalized or kenneled.

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The use of codeine cough syrups and steam inhalation (vaporizers) are of decided benefit in overcoming immediate discomfort of patients. The corticosteroids may be highly beneficial in stubborn cases.

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CLINIC

CLIFFORD L. McGINNIS, D.V.M.

Peoria, Illinois

RECENT current veterinary literature contains a number of articles concerning chronic demodectic mange. I am disturbed because we do not have this problem in our practice.

Two summers ago we treated a Collie that finally had to be destroyed. In 1952, we treated a crossbred Boxer over a period of a year with the skin problem still unresolved. This patient was killed in an automobile accident. In 1948, a Collie breeder had three dogs destroyed because of Demodex infestation. And these cases form the history of our unfavorable experience with chronic demodectic mange.

I suppose I should mention a black Cocker Spaniel we treated for six months during the middle 30's, at the North Shore Animal Hospital in Evanston, Ill. No progress was made on the case. The dog was sent to New Jersey for a course of treatment with a then new product. After another six months, the dog was returned to the owner with a normal skin.

May I make some clinical observations: *Demodex folliculorum* occurs in dogs between the ages of three months and two years. I have diagnosed it in only two dogs over two years of age. A superficial skin scraping is almost 100% accurate for diagnosis. Place a drop of oil on a slide and another drop on the skin and scrape the skin with a discarded dull surgical blade. By going deep enough to make the area red, mites, if present, can be demonstrated invariably under the microscope.

Many dogs are naturally immune to this parasite, the same as some persons are immune to mosquitoes. This immunity varies with individuals so that some dogs are observed with one or two affected areas of various size, while others exhibit generalized cases that have resulted in complete denuding. This immunity or resistance is hereditary and as an example I wish to cite the Collie breeder in our community many of whose puppies suffered such severe cases they were considered incurable. When he switched blood lines, his troubles stopped. At least half of the Dachshund puppies from one of our breeders have Demodex mange between the ages of five and eight months, but they readily respond to treatment.

Many dogs having one or two small denuded areas will recover promptly if proper attention is given to nutrition, immunization against distemper, and the internal parasite problem. If such an animal is returned in two or three weeks and new areas are developing, vigorous treatment must be started.

We have used canex®[1] since 1935 except for the time it was out of production following World War II. We tell the owner that this is a serious skin disease and that without treatment, the dog's life will be eventually sacrificed. We advise four to eight weekly treatments and we hold the pet in the hospital for two days and send it home for five days, and then have it returned for two days again. Few people have facilities for a greasy dog in their homes, and we have them greasier than the proverbial pig at the fair. Patients will lick some of this oily preparation of rotenone and get some absorption *via* the intestinal tract and absorb some more through the skin, but we have never observed any toxic reaction. If pustular areas are present, meticorten®[2] and antibiotics are in order. Local applications will cause skin irritation if applied through a heavy hair coat. For this reason animals are kept well clipped.

It is no easy task to keep an owner comfortable for two or three weeks until hair starts to grow. By then everything is rosy. We can not get satisfactory results when canex is dispensed for home use. We insist on application in the clinic and supervise the animal's progress.

On older dogs we see sarcoptic mange, eczemas, and various fungus infections but from repeated skin scrapings, we have failed to demonstrate the Demodex mite from chronic skin lesions on older dogs. We have run the gamut of all the new parasiticides as well as intravenous medication with trypan blue, but always we have returned to canex.

It has been a satisfactory drug for 20 years and has proved as substantial a standby as milk of magnesia or aspirin or the Thomas splint, and I am happy to pen an accolade to a product that has helped pay my boys' college expenses.

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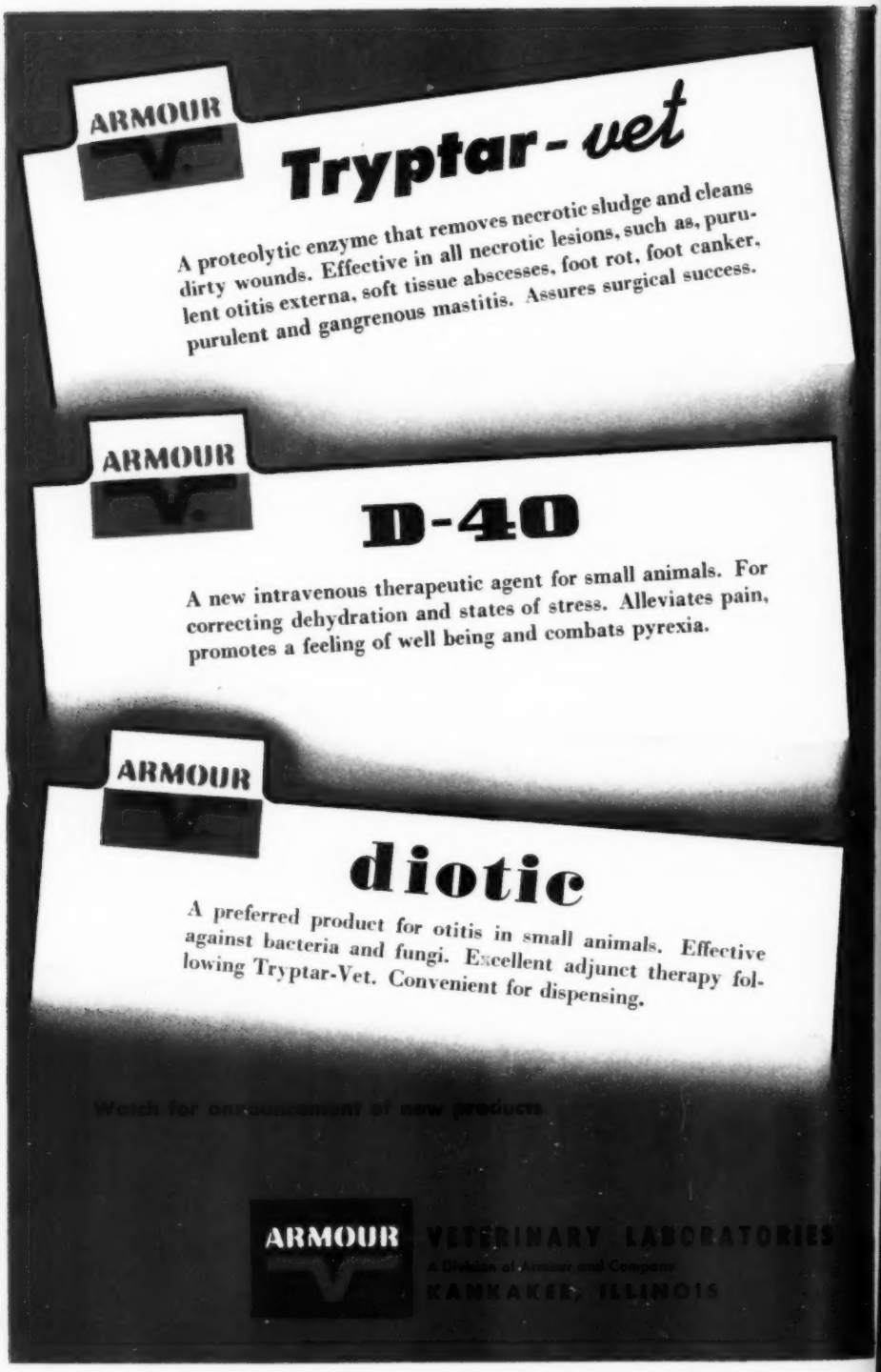
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New Developments In Animal Nutrition†

C. F. CHAPPEL,* Ph.D., Greenfield, Indiana

THERE have been many new developments in animal nutrition during the past year. To cover all of them in a single paper would be an impossible task. Therefore, only the more interesting highlights will be mentioned.

Swine Nutrition

Researchers at Iowa State College and elsewhere have recently demonstrated that the baby pig and calf do not secrete an adequate amount of proteolytic and amolytic enzymes to digest feed grade carbohydrates efficiently. This is especially true during the first three to five weeks of age. Considerable research has been conducted in which pepsin has been added to the rations of baby pigs. Certainly more research needs to be conducted in this area, but apparently the work can be summarized to date by saying that the addition of pepsin is beneficial if pigs are weaned at about three weeks of age or earlier and if they are dependent upon the consumption of a dry starter for their growth and well-being. However, adding pepsin to the starter rations for pigs weaned at six to eight weeks of age is not generally considered to be economically sound.

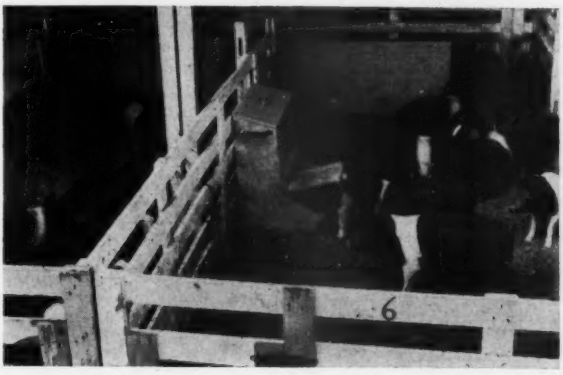
More and more growers are feeding a good pig starter from approximately one to two weeks of age on through the weaning period. The feed companies in this country today are marketing pig starters that are palatable and highly nutritious. A good pig starter decreases mortality, increases rate of growth, and generally cuts costs since the farmer gets more hogs to market at an earlier age and uses fewer pounds of feed.

Many are using better management in the production of swine such as farrowing crates, fresh water for the baby pigs and sows, heat lamps in cold weather, and general all around improved sanitation. Recent statistics indicate that over 30% of all pigs farrowed die before reaching marketable age. In the writer's opinion, more than 25% of these could be saved with adequate nutrition and good, sound, practical swine husbandry.

It has been known for several years that in order to have strong, healthy chicks that will get off to a good start, the breeding flock must be fed a ration containing adequate amounts of high quality protein, vitamin, mineral, and unidentified growth factors. However, the importance of proper nutrition for the sow has not received comparable emphasis. The old story is that a sow should get additional protein at least during the latter third of gestation. The writer believes that research will be conducted within the next few years that will demonstrate the necessity of feeding the sow a highly fortified balanced ration for a few weeks pregestation and continuing through the gestation and laction periods.

†Presented at the 73rd annual meeting of the Indiana Veterinary Medical Association, Indianapolis, Jan. 16-18, 1957.

*Animal Nutrition and Research Department, Eli Lilly & Co.



Swine fed hygromycin B, a promising broad-spectrum anthelmintic.

Recent research conducted at the University of Minnesota indicates that management to prevent sows from getting too fat will increase litter size. Many practicing veterinarians have been preaching this for a number of years. In order to prevent sows from getting fat at the Lilly research center, they are self-fed a high fiber, low energy ration which contains an adequate level of protein and is highly fortified with all the other essential nutrients and unidentified growth factors. To date, there has been little difficulty with weak pigs and baby pig anemia.

Research conducted this past year by the Minnesota group indicates that growing hogs fed an otherwise well-balanced ration will thrive on a ration containing 14 to 15% protein from about eight weeks of age until they weigh approximately 125 lb. after which they can be fed a ration containing about 11% protein for the duration of the feeding period. This work substantiates that carried out by workers at Iowa State College approximately two years ago.

Cattle Nutrition

The greatest thing that has happened in the feeding of beef cattle during the past several years has been the discovery by researchers at Iowa State College that diethylstilbestrol, when incorporated in rations for beef cattle, stimulates gains and improves feed efficiency. Since the first experiment conducted by the Iowa State group, most of the major experiment stations in this country have conducted similar research and have recommended the feeding of diethylstilbestrol to beef cattle. Diethylstilbestrol is recommended for cattle that are to be fattened for market, from the time they are approximately 400 lb. in weight until marketed, 48 hours prior to slaughter. A summary of 22 experiments conducted by agricultural college experiment stations indicates that feeding diethylstilbestrol increases rate of gain by about 16% and improves feed efficiency by about 12%. This summary is for all classes of cattle fed many kinds of rations. Feeding diethylstilbestrol and a well-balanced ration to good quality cattle should yield even greater returns.

Several experiments have been conducted during the past year in which the antibiotics, chlortetracycline, oxytetracycline, and erythromycin, have been fed to beef cattle singly and in combination with diethylstilbestrol. When the data collected from many experiment stations from various parts of the country are summarized, the feeding of approximately 75 mg. of a broad spectrum antibiotic stimulated growth rate approximately 6% and decreased the amount of feed required to produce a pound of gain by approximately 4%. Some experiments have indicated that the combination of diethylstilbestrol and the broad spectrum antibiotics is superior to feeding diethylstilbestrol alone. However, there is almost an equal number of experiments indicating no improvement or inferior gains from the addition of antibiotics to a ration that contains diethylstilbestrol. Quite possible the addition of antibiotics to rations for beef cattle will eventually prove advantageous; but more research must be conducted in order to determine the proper level to feed, length of feeding period, and the economy of feeding.

It should be pointed out that diethylstilbestrol is recommended for animals that are to be fattened for market and is not recommended for feeding to breeding stock. However, research conducted at Iowa State College, Kansas State College, and at the Lilly Agricultural Research Center indicates that the feeding of 10 mg. diethylstilbestrol daily to pregnant heifers or cows does not in any way adversely effect the reproductive capacity of these animals. Researchers at Kansas State College have actually fed dairy cows 1 mg. of diethylstilbestrol per 100 lb. of body weight prior to breeding, during gestation, and during the following lactation period. Identical twins were used in these experiments and the treated twins performed equally as well as the control twins.

In an experiment at the Lilly Agricultural Research Center, 50 grade Hereford heifers were divided into five lots of ten heifers each

TABLE 1.

Treatment	Ave. Daily Gain (lb.)	Feed Consumed (Lb.)	Feed Costs Per 100 (lb.) Of Gain ($)
Control (basal ration)	2.51	920	19.32
Control + 5 mg. diethylstilbestrol	2.83	830	17.51
Control + 10 mg. diethylstilbestrol	3.02	780	16.54
Control + 20 mg. diethylstilbestrol	2.87	830	19.26
Control + 100 mg. diethylstilbestrol	2.69	840	19.49

and were self-fed a fattening ration in drylot. An 84-day summary of average daily gains, feed consumption, and feed costs per 100 pounds of gain is presented in table 1.

The heifers fed 10 mg. of stilbestrol gained 20% faster and converted their feed 18% more efficiently than did the control heifers. After being on experiment approximately 70 days the heifers were bred to two Angus bulls. The heifers were then slaughtered after being on feed for 168 days, and fetuses were recovered. Conception rates for lots one through five were 50, 70, 89, 90, and 22% respectively. From the data obtained in this experiment, it was apparent that 10 mg. or 20 mg. daily of diethylstilbestrol did not adversely effect reproduction in these heifers. However, feeding 100 mg. diethylstilbestrol daily (ten times recommended feeding level) apparently altered the reproductive cycle and interferred with conception. Carcass data indicated that there were no differences in shrink to market, dressing percentage, cooler shrink, and federal grade due to feeding stilbestrol.

Dairy Cattle Nutrition

Recent research indicates that raising the energy level of calf milk replacers improves them tremendously. The modern calf milk replacer should contain about 10% animal fat, 20% protein, and a maximum of 2 or 3% fiber. In addition, the milk replacer should contain from 12 to 20 mg. of antibiotic per pound of complete feed.

Lamb Feeding

Research conducted at Iowa State College indicates that the feeding of 2 mg. diethylstilbestrol per head daily increases gains in wether lambs by approximately 30%. In another test, the addition of 10 mg. of chlortetracycline to the diet of ewe lambs increased daily gains by about 18%.

Research recently completed at Purdue University may lead to marked improvement in feeding of suckling lambs. Significantly greater gains were obtained daily from suckling twin lambs fed creep rations containing sugar, antibiotic, extra vitamins, and minerals as compared to a creep ration made up essentially from natural ingredients. In addition, this super creep feed improved the carcass quality. The Purdue workers were able to demonstrate that twin lambs will grow as rapidly as single lambs if they have access to a highly fortified creep ration.

Poultry Nutrition

There has been a marked improvement in broiler rations during the past year. In many instances, broiler production costs have decreased as much as 10%. Much of this improvement has resulted from the application of the calorie-protein ratio concept in formulating high energy feeds, but other factors such as improved birds, better disease control, and improved management have also played an important part. Recent studies by poultry nutrition researchers at the University of Mary-

Temporary cattle feeding barns where stilbosol (diethylstilbestrol premix, Lilly) is being tested under different conditions.

land and other college experiment stations indicate that the proper level of protein and energy in a broiler ration is about 42 calories of productive energy for each percent of protein in the ration. It has been known for a long time that poultry are unable to digest fiber efficiently, and therefore, can not make good use of high fiber feeds. The use of dehulled soybean meal, substituting low fiber grains for higher fiber grains, and the addition of animal fats to broiler feeds has made this high energy ration possible and practical. Since the growing chick regulates its feed intake by its energy requirements, it has been necessary to revise recommendations for amino acids, vitamins, and minerals. When the major portion of the protein in the broiler rations is composed of soybean meal, the first limiting amino acid is methionine. The addition of methionine to practical broiler diets has been practiced during the past two or three years. Recent experimental evidence indicates that the methionine requirement, expressed as a percent of the diet, is increased as the productive energy content of the diet is increased. This concept will apply to rations that are complete in all nutrients except methionine. Recently a similar relationship was also found with lysine.

Three years ago a practical broiler ration was expected to produce a three-pound broiler in about ten weeks on about 2.8 lb. of feed per pound of gain. Today most of the broiler rations marketed by the various feed manufacturers will produce a three-pound broiler in nine weeks or less on 2.2 to 2.5 lb. of feed per pound of gain. Broiler rations are becoming more and more complicated each year, a fact which may be illustrated by stating that a practical broiler ration today may contain as many as 30 different ingredients and feed additives. Today broilers as well as replacement chicks are fed almost exclusively on a completely mixed ration.

Rations for laying hens have changed in a somewhat similar pattern as those for broilers in that higher energy rations are being utilized, and an effort is being made to balance the rations for laying hens on the protein-calorie ratio basis. High energy rations are generally more economical for laying hens. Although they cost more per ton, fewer pounds of feed are required per dozen eggs. This has resulted

in a saving in transportation and labor and has also meant a net decrease in cost of feed required to produce a dozen eggs.

Considerable research has been conducted this past year on the addition of high levels of antibiotics (50 to 200 gm. per ton) to rations for laying hens. Some tests which have been completed, have indicated that the addition of certain antibiotics may increase egg production and improve feed efficiency. However, considerable more research must be completed in order to determine the economy of the practice.

Ingredients Improved

Feed ingredients have also changed considerably during the past few years. With the aid of the Nutrition Council of the American Feed Manufacturer's Association, the soybean meal producers of this country have done an excellent job of standardizing their product and improving the quality of protein. The same thing can be said for the producers of cottonseed meal, dehydrated alfalfa meal, distillers' solubles, fish meal, dried whey, meat by-products, and many other ingredients that are generally used in the manufacture of commercial feeds.

Pelleting Feeds

In the past few years, several feeding tests have been completed which indicate that the pelleting of rations increases their feeding value. It has been suggested that the increased density of pelleted feed is the primary reason for this favorable response. However, research conducted recently at Washington State College indicates that there may be some actual nutritional or chemical change that takes place when feeds are pelleted that increases their nutritional value to the animal. In one experiment with broilers fed from one day of age to nine weeks of age, pelleting of the ration increased rate of gain by approximately 16% and improved feed conversion approximately 12%. Pelleting the ration and then grinding the pellets also improved rate of gain and feed efficiency but to a lesser degree than did the unground pellets.

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Illustrating conditions under which rate of lay experiments are conducted. Various antibiotics are fed poultry in these experiments.

Minnesota Brucella Free

Minnesota became the seventh state to complete a planned control program for bovine brucellosis and was declared modified certified brucellosis free as of June 1, 1957. Congratulations were forwarded Minnesota Governor Freeman by Acting Secretary True Morse in which was emphasized the value to be derived from federal-state cooperation in animal disease control programs.

Though incidence of Brucella infection is markedly reduced, Minnesota plans continued efforts to achieve virtual eradication. Both the milk test and blood test in reacting or suspicious herds will be continued.

The program in Minnesota was directed jointly by Dr. Ralph West, executive officer, Minnesota Livestock Sanitary Board, and Dr. Fred C. Driver, veterinarian in charge of USDA animal disease eradication work in the state.

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D. C. Academy Organized

The District of Columbia Academy of Veterinary Medicine has been recently organized by a group of greater Washington veterinarians. Every effort will be directed toward furthering knowledge of small animal medicine and surgery.

Post Graduate courses will be offered by the Academy in the latest surgical and diagnostic technics.

Qualifications of membership are: One must be a licensed veterinarian actively engaged in the care and treatment of small animals; and be a member of the American Veterinary Medical Association.

Dr. Robert M. Lynn has been elected president; Dr. W. Harry Cowan, vice president; Dr. Jean S. Goudy, secretary; Dr. Louis Sorde, treasurer; and Dr. H. Carlton Newman, president-elect.

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Iowa State Homecoming Luncheon

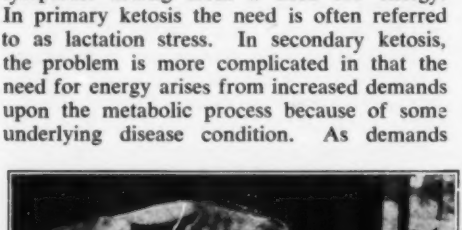
The ninth annual Veterinary Medical Alumni homecoming luncheon will be held in the courtyard of the Veterinary Medicine Quadrangle on October 26, 1957. Tickets may be purchased in advance, or at the door. The homecoming football game, I.S.C. *vs* Colorado, will follow the luncheon. R. Y. Sevde, Secretary.

A Practitioner's Approach to the Ketosis Problem†

CHESTER E. HARRIES, D.V.M.,
Medford, Wisconsin

Ketosis or acetonemia as it is presented to the practicing veterinarian can be classified in to two categories: First, the primary, which responds to treatment readily, and the secondary type which is complicated frequently by concurrent pathological process and poses most of the difficult problems.

Basically, ketosis is a concurrent set of symptoms arising from a need for energy. In primary ketosis the need is often referred to as lactation stress. In secondary ketosis, the problem is more complicated in that the need for energy arises from increased demands upon the metabolic process because of some underlying disease condition. As demands



Dr. J. T. Alston of Tupelo, Miss., first called this disorder "palsy after calving" in 1933. Today it is still a problem. In high producing cows, Doctor Alston found that about 40% of milk fever to be complicated by acetonemia.

for additional energy present themselves, there is consequent decrease in milk production, rapid loss of weight, inappetance, and oftentimes nervous symptoms. Primary ketosis develops spontaneously, sometimes even overnight, without apparent complicating pathology. Secondary ketosis which presents the greater problem results from one, or a combination of several complicating conditions, which interfere with appetite or actually increase energy demands.

From experience of my own I agree with writers of a good many papers on this subject that the demands for energy usually occur during that critical time or the one immediately following parturition. Whenever called to see a sick cow, regardless of season or lactation period, ketosis or acetonemia should be considered possible cause. Ketosis occurs in Wisconsin at all seasons even during that portion of the year when pastures are referred to as lush.

This discussion will be concerned primarily with ketosis of the secondary type, or that complicated by referable infections.

When called to see a cow that is reported "sick," the owner suggests the diagnosis by stating that the animal has "anemia," "sugar-sickness," or a number of other names. I try to avoid consideration of these owner-diagnoses until I have opportunity to examine the animal. However, I am human too, and more than once I have found myself treating the cow before I even saw the animal.

Probably the most important factor on which successful treatment is based is to make an accurate diagnosis. One must examine the individual and select a medical program for the subject patient. History taking is emphasized. I encourage owners to express themselves by asking questions: "Tell me what you think?", "How is the cow acting?", et cetera.

Many times owners will suggest some little hint or something that may influence the picture. Gross examination continues while questioning is pursued. Most of the questions are more or less routine. The first one usually is, "When did the cow freshen?" "Did she clean?" "When?" "Did it appear that she did a good job or not?" "Has she ever had mastitis?"

"What about urine?" "Has she been urinating normally?" "Has it been frequent?" "Has it been discolored?" "What about signs of coughing or pneumonia?" "Has there been any winter dysentery in the herd?" Questioning to acquire as much individual and herd history makes possible elimination of some considerations with which ketosis is frequently confused.

The field test for ketone bodies in the urine is a necessary adjunct to diagnosis. Sometimes milk is used. The test assists in differentiation.

Experience has shown that catheterizing ketoic cows is hazardous. Urine is collected by gentle massage. Heifers suspected of ketosis sometimes are negative to test and if excessive salivation is observed, it is our practice to examine the teeth. First-calf heifers often suffer dental troubles at this age which when neglected result in typical acetonemia. If vagi-

†Presented at the 73rd annual meeting of the Indiana Veterinary Medical Association, Indianapolis, Jan. 16-17, 1957.

nal discharge are present it is recommended that rectal examination of the uterus be made to eliminate possibility of metritis.

Treatment

Treatment of ketotic cows should be symptomatic. Glucose is employed even though other conditions such as metritis or mastitis are present. The underlying cause must be sought and resolved. Owners are beginning to understand complexities of these conditions and appreciate thorough efforts to reveal abnormals that may be responsible. Keep traumatic gastritis, displaced abomasum, and any other disorders of the digestive tract in mind as examination progresses.

If there is no favorable change promptly (two or three days), I would advise going over that cow again, repeat the same procedures in an effort to disclose cause. Unless one arrives at an accurate diagnosis, accurate prognosis is impossible.

Overfeeding too soon after apparent recovery has complicated complete resolution. In our experience owners must be cautioned not to overfeed, but to bring animals up to full feed gradually. We advise care especially with regards to grain and ensilage. Allow hay *ad lib*. Make sure that good water is supplied in abundance and that salt is available. In our experience glucose provides energy promptly and regardless of pathology responsible for ketosis, glucose is employed freely. Chloral hydrate combinations also are useful, as are the newer hormone preparations, ACTH, et cetera, the latter employed particularly in cases of primary ketosis. For secondary ketosis the underlying cause must be resolved promptly.

We practice preventive medicine in Wisconsin and encourage dairymen to use ketosis test tablets on all cows that freshen. By these means we are called promptly to either dispense or treat affected animals.

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Sale of Hog Cholera Virus Restricted in 16 States

Legislation now enforced or soon to become effective restricts sale and use of virulent hog cholera (simultaneous) virus in 16 of the 48 states. These include: Alabama, Georgia, Tennessee, Mississippi, Florida, Louisiana, Arkansas, Montana, North Dakota, New Mexico, South Carolina, Utah, Wisconsin, Wyoming, Kentucky, and Illinois.

Large Animal Parasitology in Veterinary Practice†

A. C. TODD,* Ph.D., Madison, Wisconsin

Present expanding interest in veterinary parasitology perhaps is greatest in helminthology. Such present interest doubtless is derived from the present status of the veterinary profession and the greater emphasis the profession now places on the practice of preventive medicine. There is no question that modern intensive agriculture will require even greater emphasis upon preventive medicine.

In veterinary training the first glimpse of "infectious" or host-parasite disease ordinarily occurs in the basic course in parasitology. Perhaps it is unfortunate that the basic subject must be so thorough and so widespread in its coverage that the graduate veterinarian is apt to retain only an impression of hundreds of scientific names and thousands of bottled specimens. This is to say that in the field too many veterinarians have the impression that parasitology can be practiced only when it is based upon detailed taxonomy.

The fact of the matter is that worm infections are primarily herd infections and must be treated as such. Herd infections escape attention unless an infection accumulates to such a degree in an individual animal that clinical signs of distress become apparent.

It may well be that past emphasis placed upon treatment of the individual animal with a clinical level of infection largely has been incorrect, particularly from the standpoint of modern intensive agriculture.

By definition the helminths cause chronic insidious, or hidden infections. These infections are now known not to be limited by climatic barriers in any part of the United States. In similar vein, our healthiest herds and flocks are now known to be parasitized. The so-called primary barriers to infection, sanitation, management and proper feeding, are only partially effective against worm parasitism and do not constitute adequate control in themselves since they are incomplete. Another necessary primary control against worm parasitism in the average healthy herd obviously must be preventive treatment.

Applied preventive parasitology requires that preventive treatment be instituted from a herd

†Presented at the 73rd annual meeting of the Indiana Veterinary Medical Association, Indianapolis, Ind., Jan. 16-18, 1957.
*Department of Veterinary Science, University of Wisconsin.

diagnosis and that response to treatment must be measured not from the response of an individual animal but from the production of a herd as a whole. The herd diagnosis and preventive treatment should not be based on what we know to be an arbitrary number of eggs, or worms, in order for treatment to proceed; it must be a qualitative and not a quantitative diagnosis, since there are none but production standards to prove the diagnosis of herd infection.

The basis of preventive parasitology in practice is a system of dispensing by the veterinarian at the better farms in his practice in order that preventive parasitology be retained under veterinary control. By custom, anthelmintics have been dispensed in swine practice and in part in sheep practice; veterinarians now must dispense anthelmintics for parasite control in their cattle practices.

A method of dispensing anthelmintics in dairy cattle practice at one of Wisconsin's leading dairy farms resulted in treated heifers gaining a definite growth advantage over their non-treated controls. This method was based on dispensing phenothiazine N.F. so that the herdsman could place 2 gm. in the morning grain ration of each heifer being grown out. Heifers on pasture in the summer months each received 1 oz. of phenothiazine in tablet form each 30 days.

The development of parasitology in veterinary practice was hampered in the past by the nature of the anthelmintics available. Most veterinarians are aware of the increased participation on the part of industries and their research sections in the development of the newer anthelmintics. The one consistent feature of the newer anthelmintics is their margin of safety when compared with the older anthelmintics. The very newest anthelmintics now being developed not only have greater margins of safety than ever before but they are being developed for specific animal groups and have a broader spectrum of activity against all of the major kinds of helminths. The broad spectrum activity of a new swine anthelmintic, hygromycin, will have been illustrated during this presentation.*

Finally, the newer anthelmintics are noteworthy in that they are being developed to meet a method of administration. The tendency today is to develop anthelmintics which can be administered in feed or in drinking water. The practice is to use the anthelmintic in subtherapeutic levels on a continuous daily basis. The question remaining is whether the veterinary profession will move to direct the use of feeds and minerals medicated with anthelmintics. Veterinary direction of preventive parasitology will be necessary.

*Goldsby, A. I., and Todd, A. C. A New Swine Anthelmintic. *N. Am. Vet.*, 38:140, 1957.

Editor's Note—*The author's remarks as reproduced here served as a preamble to a scientific discussion of parasitism in large animals, and the new anthelmintics, most of which had already been submitted for publication or had been published. These remarks were intended to point out to practitioners that areas of lucrative practice remained available to them on adoption of the concepts set forth, provided they proceed on the basis of preventive treatment for subclinical parasitism. The author maintained with support of a considerable body of facts that the veterinary profession must move into this practice, or the control and prevention of internal parasites will ultimately be handled by nonprofessionals.*

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National Hog Farmer, a monthly published for swine producers, reports results of a recent survey of subscribers indicating that the trend to confinement rearing and finishing of hogs was multiplying their disease problems. Among swine parasites, roundworms caused the most trouble and losses; of diseases, rhinitis, transmissible gastroenteritis, and erysipelas were listed as most important.

It was also indicated that the bulk (62%) of drugs and treatment agents were purchased from local veterinarians; the remainder approximately equally divided between the feed store and druggist.—*Feedstuffs*, 7/6/57.

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Cesarean Section in Cattle

(Continued from page 436)

If it is utilized as such, the surgeon will be disappointed in the results.

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EDITORIAL COMMENTS

Anthrax Outbreak in Oklahoma

Recent advice of the office of the state veterinarian of Oklahoma, Dr. M. N. Riemenschneider, describes as "'serious" an outbreak of anthrax in northeastern Oklahoma. On August 1, the northern portion of Craig County (adjacent to the Oklahoma-Kansas state line) was declared a quarantined area and units of the National Guard were called to police that area until an adequate civilian regulatory force could be mobilized. Movement of all livestock and livestock products, including milk, eggs, hay, and straw have been restricted within the area to avoid spread of the disease.

The area is generally river bottom grazing land and was subjected to severe flooding during the past spring. First cases appeared among sheep. Losses have not been tabulated completely but are reported as significant. Veterinarians in private practice in the county and federal-state personnel have initiated a vaccination program and plan to vaccinate all susceptible, in-contact species as rapidly as possible in the area and those likely to have fence contact with exposed herds or those in which losses have occurred.

The choice of vaccine in control of midsummer outbreaks of anthrax has been controversial. Choice may be limited at times because of unavailability of adequate supplies. Some authorities recommend intradermal spore as the most practical approach to control in the face of an outbreak. Protective immunity induced is prompt (as early as the third postvaccination day) and losses usually are curbed by the fourth day. (See USDA Technical Bulletin 468.) Intradermal spore vaccines have specific levels of virulence that vary, thus guide levels of virulence are established by serological methods.

A new vaccine developed during recent years in South Africa (Sterne vaccine) has given results far surpassing those obtained with other vaccines in that country. Considerable experience with this vaccine in this country has established its advantages. The Sterne vaccine is an avirulent variant developed under certain cultural conditions. These are morphologically indistinguishable from virulent strains but they have lost their power of producing capsules, and with this, also their ability to invade body tissue and the power of causing fatal septicemia. Sterne vaccine induces protective immunity more rapidly than the older saponinated spore vaccines, but not so rapidly as intradermal vaccine. It can be used on all species of domestic livestock.

Action by adjoining states has been taken to impound animals moved illegally from quarantined area.

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Fats Wrongly Condemned

Animal fats and cholesterol, two food components of particular concern to the meat industry, may have been prematurely condemned as causal agents in certain kinds of heart disease, Dr. Philip L. White, secretary of the American Medical Association Council on Foods and Nutrition, reported to the National Live Stock and Meat Board meeting in Chicago, June 13.

Medical evidence now indicates that "coronary and cerebral artery diseases and thrombosis are of multiple etiologies," and not a result of fat alone. "Fats are a perfectly normal constituent of the body," Doctor White stated, "and are a perfectly normal constituent of the diet."

Clarification of the problem has been prompted by continued adverse publicity regarding the consumption of meats and meat fats. During the past several years the public has been told constantly to avoid gaining weight and that animal fat is the culprit in the cause of heart disease. As a result, consumers of meat food products have become calorie conscious in the same way that smokers have become filter-tip conscious. Producers of meat food products probably can expect an increased demand for leaner cuts of meat.

Quoting an editorial in the *Journal of the American Medical Association,* Doctor White said: "The one definitive conclusion is that quite a bit more study concerning dietary fats will have to be done before the average American's eating habits are to be drastically altered."

Fats in the human system are manufactured from carbohydrates and proteins as well as

taken in as food. Combined with proteins they are soluble in the aqueous medium of the blood.

Cholesterol and unsaturated fatty acids combine with protein to form large molecules called lipoproteins. These enter the coronary arteries and diffuse into the walls of the vessels. In the circulation of lipoproteins and loosely bound fat through arteries, deposits rich in cholesterol may ultimately restrict the flow of blood to the muscles of the heart.

Without indulging in many of the sweeping phrases that have characterized comments on heart disease, Doctor White believes that deposits in the walls of the arteries which obstruct the flow of blood and bring on myocardial infarct — or blood clot — are related to the "metabolism of fats and fat components." It must be pointed out, however, that "the composition of the fat in lipoproteins reflects the dietary fat eaten, and stored body fat, as well as the fat that is manufactured by the body from ingested carbohydrates and proteins. One factor often overlooked is that some of the fat found in lipoproteins and fat deposits are manufactured by the body from non-fat materials."

It is important to remember, warns Doctor White, that clinical tests conducted thus far have been pursued under highly controlled conditions, and were devised to hold dietary components constant, except for fat intake. Fats used in these tests were purified. Under such clinical conditions it has been demonstrated that animal fats increase blood cholesterol and that plant fats lower it. Similar findings have not been available in studies of patients on regular diets. In the passage from experimental conditions to free living man, beef and pork fat and other animal fats have been unnecessarily condemned.

Evidence implicating cholesterol content of the blood and lipoprotein spectra is therefore circumstantial to clinical tests. Researchers do not now have a direct way of evaluating a condition of the arteries, and accordingly are compelled to use the indirect approach. Measurement of the cholesterol level has provided that indirect approach, but absolute proof is lacking.

"Adults who are not overweight, without any family history of early death from heart disease, and with relatively low levels of serum cholesterol (in the range of 175-225 mg.%) need make no changes in their diet assuming they already consume a variety of foods providing a well balanced diet."

Dean Armistead to Michigan State University

Dr. W. W. Armistead, dean of the School of Veterinary Medicine, Texas A. & M. College, College Station has resigned his position and accepted the deanship of the College of Veterinary Medicine, Michigan State University, East Lansing. He will assume his new duties Sept. 1, 1957.

Dr. W. W. Armistead

Doctor Armistead was named dean of the Texas school in 1953. He holds his D.V.M. degree (1938) from Texas A. & M. College, M.S. (1950) from Ohio State University, and Ph.D. from University of Minnesota. He is now president-elect of the A.V.M.A. and will be installed as president at the forthcoming Cleveland meeting.

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Public Health Service Research Grant and Fellowship Programs Which Apply to Veterinary Medicine

The Public Health Service is charged with the responsibility for conducting and supporting research into the causes, diagnosis, prevention, and treatment of diseases and disabilities of man. In addition to the extensive research conducted in government laboratories, the Service provides support of research and training in non-government institutions. Schools of veterinary medicine and related institutions, and workers therein other than physicians or dentists, would be eligible for the following types of grants and awards:

1. *Research Grants* — made to universities, hospitals, laboratories, and other public or private institutions and to individuals for support of research projects in health, medicine, and allied fields.

2. *Research Fellowships.*

a. Post-doctoral Research Fellowship — awarded to qualified persons holding a Doctor's degree in medicine, dentistry, or related fields. For example, such a fellowship might be awarded to the holder of a D.V.M. degree to support work leading to the Ph.D. degree.

b. Special Research Fellowship — awarded to qualified applicants who have demonstrated unusual competence for research, or who require specialized training for a specific problem. For example, such a fellowship might be awarded to support training in a basic science which may be applied later to the study of an animal disease transmissable to human beings.

3. *Health Research Facilities* — grants to assist in the construction and/or equipping of additional facilities for research in the sciences relating to health. This is a matching program: Federal funds may not exceed 50% of the total costs of the research portion of the facility, the remaining sum to be provided from non-federal sources.

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Rewards of Garbage Cooking Restrictions

A Riverside County (California) hog feeder was fined $500., and placed under a three-year probation for violation of state laws requiring cooking of garbage prior to feeding swine. The law requires that all commercial garbage fed to hogs, regardless of previous processing, be sterilized at boiling temperatures for 30 minutes. Approximately 340 hog feeding premises are licensed in the state. Hog feeders in California have spent nearly $2,000,000. for cooking equipment and improved facilities to comply with state requirements.

Offsetting the cost are favorable results; there have been no outbreaks of vesicular exanthema in California since effective date of the law. This does not consider even greater value in prevention of other diseases of swine and also of man.

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An estimated 7,000,000, or 70% of all beef cattle on feed, are now receiving feed supplements containing stilbestrol.

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Improper dilution and use of insecticides are the most common causes of livestock poisoning.—*J. G. Graca, D.V.M.*

Lt. Col. T. C. Jones now Pathologist at Angell Memorial Animal Hospital

Lt. Col. Thomas Carlyle Jones, V. C., U. S. Army, has resigned his commission to accept the position as pathologist at the Angell Memorial Hospital for Animals on July 1, 1957. Colonel Jones will also be a clinical associate in pathology at the Harvard Medical School and veterinary consultant to the Cancer Research Institute on Deaconess Road in Boston.

Lt. Col. T. C. Jones

He served as chief of the Veterinary Pathology Section of the Armed Forces Institute of Pathology in Washington, D. C. from 1946 to 1950. He is coauthor of two books, Veterinary Necropsy Procedures and Veterinary Pathology, and author of numerous scientific articles, and is well known as a lecturer before veterinary and medical groups.

During his Army career, Colonel Jones has been officer in charge of the U. S. Army Veterinary Research Laboratories at Front Royal, Va., and at Fort Robinson, Nebr. He was also chief of the Veterinary Department of the 4th Medical Field Laboratory in Germany. On completion of his present tour of duty at the Armed Forces Institute of Pathology he was awarded a certificate for distinguished achievement.

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German scientists report isolation and culture of *Trichomonas fetus* in embryonating hen's eggs. Authors suggest the addition of antibiotics to test samples from the prepuce of infected animals to exclude contaminants during isolation. Reuss, M., *Berliner Muenchener Tieraerztl. Wschr.*, 70:67, 1957.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.

Manhattan, Kansas

Cottonseed Meal Poisoning

Gossypol poisoning is still a matter of considerable interest in all animal feeding practices where cottonseed meal is part of the ration. Cattle receiving an excess of cottonseed meal (more than 1 lb. daily) develop an abnormal condition of the eyes, urinary, and digestive disturbances, and incoordination of movement in many instances. It is considered to be, by some authorities in a measure, a vitamin A deficiency, because the addition of pea green alfalfa to the ration appears to be a preventive. In swine, the autoclaving of the cottonseed meal is a precaution that is a safeguard. From the Texas Agricultural Experiment Station there is a recent research project report indicating as follows: (1) When the gossypol content is less than 0.01% it is a safe level in the cottonseed meal as ration for growing-fattening pigs, (2) if the level was about 0.01% there was poisoning and some deaths, but if at the same time the pigs received 30% of protein there was no toxicity. This is a valuable contribution to our knowledge of cottonseed meal poisoning.

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Resistance to Parasites

Sweatman of the Animal Pathology Division of the Canadian Department of Agriculture in cooperation with the Institute of Parasitology report on Acquired Immunity in Lambs infected with *Taenia hydatigena* in an article in the Canadian Journal of Comparative Medicine for March 1957. In this the author states that "Absolute acquired immunity was demonstrated in two Shropshire lambs that became infected initially under pasture conditions in Quebec. A similar resistance was produced by 50 to 800 ova in ten three-month-old experimental Suffolk lambs as shown seven weeks later by administering a challenging dose of 5,000 ova." In addition the author notes "It is stated generally that the degree of resistance of a host to a parasite is partially dependent on the diet of the host, its genetic constitution and age."

Q Fever Organisms Susceptible to Proper Pasteurization

The Q fever organism *Coxiella burnetii* is isolated from milk of infected cows exhibiting no outward signs of illness. Consumers of such milk frequently suffer mild to severe symptoms of either an acute or chronic nature such as chills, prostration, fever, frontal headache, et cetera. Other methods of human infection that appear to be of significance are the inhalation of dust in the vicinity of infected animals, or possibly infection through abraided skin. The point of importance in this paragraph is that it has been demonstrated that heating milk for 30 minutes at 143 F. does not render the organism harmless, though a temperature of 145 F. for the same length of time is effective. This fact then may be interpreted to mean that the present standard of pasturization *i.e.* 161 F. for 15 seconds is adequate.

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Source of Vibriosis

The Montana Veterinary Research Laboratory in a discussion concerning the Role of the Ram in Vibriosis has amongst other items the following conclusion: "Both field and experimental findings indicate that the ram is not the source of ewe infection. The relative ease with which abortion can be produced by inoculation late in pregnancy indicates the possibility of natural infection during gestation from infected premises or some other as yet undetermined source."

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It is claimed (*The Indian Veterinary Journal*, March, 1957) that in some parts of the world bone meal may be contaminated with anthrax spores. Blackleg organisms were also detected in several samples of bone meal. In some instances the contaminated bone fed to cattle or used as bone meal manure was blamed for the outbreak of anthrax and for blackleg. We have not learned of comparable situations in American cattle.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Chronic Respiratory Disease (CRD)

Chronic Respiratory Disease Complex (CRD) in Chickens, University of Massachusetts Agricultural Experiment Station Bulletin no. 486 (March 1957) combines a review of the subject and description of the complex with a summary of the research conducted during the past few years at the University of Massachusetts.

The research work reported was based on a study of 268 chickens in 77 consignments, submitted from 69 farm flocks affected with respiratory diseases. The authors (VanRoekel, Gray, Shipkowitz, Clarke, and Luchine) included in their examinations chickens ranging in age from five weeks to two years. Their results revealed that CRD may be a serious problem in all ages, that it usually manifests itself in young chickens, but then may persist for months in older or mature birds.

Among many other observations made by the authors the following are examples: (1) Egg production may or may not be affected; (2) mortality is usually confined to young birds and is low unless complicated with viral or bacterial infections; (3) outbreaks may occur without apparent stress factors but Newcastle disease (ND) and infectious bronchitis (IB) either through vaccination or natural infection may precipitate the disease; (4) the value of antibiotics in natural outbreaks is questionable; (5) turkeys are more susceptible than chickens to the pleuropneumonia like type organism (PPLO) of CRD; and (6) lymphofollicular and exudative-granulomatous reactions are the most characteristic pathological responses in CRD infected chickens.

The "CRD agent" consistently referred to by the authors apparently is the PPLO organism which is generally conceded by most investigators to be an important contributing factor in producing the disease, if not the etiological agent. An important phase of the research was the attempt made to determine the possible etiological role that microorganisms other than the CRD agent played in the losses which occurred in the 69 flocks studied. As an example, their viral isolation studies revealed that 52 of the 77 consignments yielded ND virus, while 63 of the 77 consignments yielded the CRD agent.

E. coli was also a possible attributing stress factor in the flocks studied. When complicated with *E. coli* infection, mortality in CRD outbreaks may be greatly increased according to these authors. In their studies, IB was not a factor since none of the flocks studied were infected with this disease. A number of fungal species were isolated but they did not appear to be complicating stress factors. Other bacteria isolated frequently enough to suggest a possibility of contributing to the losses include *Micrococcus* varieties *albus* and *aureus*, Streptococcus sp., Bacillus sp. and an unidentified Gram-negative rod.

Aureomycin appeared to be the most frequently used drug in the field outbreaks, but from incomplete and indefinite results obtained it was concluded that antibiotics have little real merit in the control of CRD.

One of the outstanding sections of the report is that on pathology. It includes detailed gross and microscopic descriptions and the latter are well illustrated.

The list of references contain 57 titles on the disease or relating to it.

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Molybdenum in Feeds

The formulas for commercial poultry feeds routinely call for a number of "Trace" minerals that definitely are required by poultry but in extremely small amounts. Molybdenum is an example of such a trace mineral which has been found to be capable of producing as high as 15% larger birds than those diets lacking it. According to a recent report (*Poultryman*, Vineland, N. J., April 5, 1957), researchers at Texas A. & M. College have discovered that it only requires 25 cents worth of molybdenum to 1,000 tons of poultry feed. They estimate this trace of the mineral can mean an extra $18,000. worth of chicken at market time. The actual amount of molybdenum needed for 1,000 tons of feed is 2 oz., so it really is a "trace" mineral as far as poultry needs are concerned.

THE PRACTITIONER'S LABORATORY

WILLIAM L. SIPPEL, B.S., V.M.D., M.S., Ph.D.
Kissimmee, Florida

A Test for Arsenic Poisoning

Despite the advance of the chlorinated hydrocarbons and organic phosphates, calcium and lead arsenates are still used extensively to control insect and plant pests. These sources, together with residues from old dipping vats and stores of old cotton dusts in the south, still furnish the practitioner with occasional cases of arsenic poisoning.

The Reinsch test detects the presence of arsenic, mercury, antimony, bismuth, or silver. The first two are of significance in animal poisonings. This test is a simple one that can be performed by the practitioner in his office laboratory. Only readily available solutions, copper wire or squares, and glassware are required.

Materials (Fig. 1) and Equipment

1. Dilute (2-8%) HC1. (Add 10 ml. of reagent grade HC1 (37%) to 90 ml. of distilled water, giving approximately 3.7% HC1; 21.6 ml. of 37% HC1 in 100 ml. gives approximately 8% HC1.)

2. A coil of cleaned copper wire. (Dip in concentrated nitric acid until bright. Thoroughly rinse off all nitric acid before using the copper wire.) One-half inch squares of copper may also be used and should be brightened as above.

3. Distilled water, alcohol (ethanol), and ether for rinsing wire after the test.

4. Fowlers solution or some source of arsenic for positive control tests.

5. Large pyrex test tubes (29 mm. x 200 mm.) or small beaker (250 ml.) for conducting the test.

6. Water bath. (800 ml. beaker or other vessel.)

Technic

1. Place 10-25 gm. of stomach or rumen contents, finely minced liver or other suspected material in the reaction tube. If the stomach contents are quite fluid, this will dilute the HC1 below the effective level (2%), so compensation should be made for excess fluid by using the more concentrated (8%) acid.

2. Mix with enough dilute HC1 to make a fluid suspension.

3. Place in boiling water bath for 15 minutes to help drive off sulfides which might blacken the copper and give a confusing result.

4. Insert the copper wire or square, using clean forceps to handle the metal. Do not touch it with the fingers after rinsing off the nitric acid, as reducing substances such as nitric acid, nitrates or chromates will interfere with the test.

5. Observe copper at 15 minute intervals for the two hours the tube is in the water bath. (Fig. 2).

6. Remove copper with forceps, wash in water, alcohol, and ether, and allow to dry.

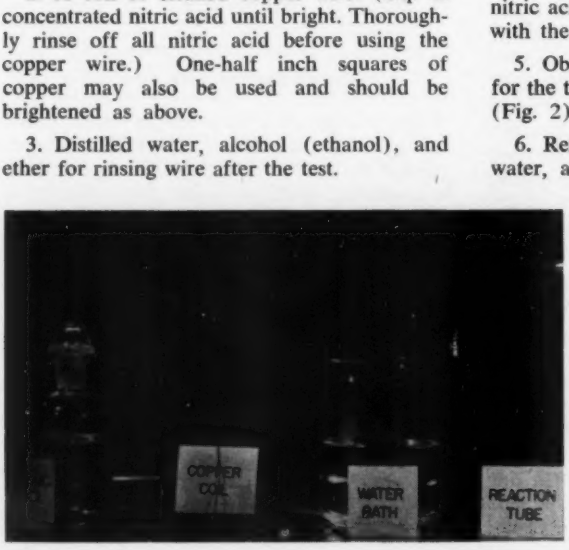

Fig. 1. Materials and equipment needed to perform the Reinsch test for the presence of heavy metals.

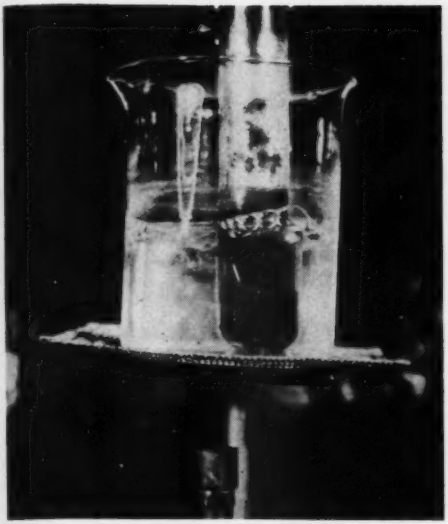

Fig. 2. Test in operation. Reaction tube containing liver suspension, copper wire and hydrochloric acid in boiling water bath.

7. The test sample should be run in duplicate and tubes containing (1) a negative control (reagents only), and (2) a positive control (reagents plus 2 drops of Fowler's solution) should be included. This will require four tubes per test.

A positive test for arsenic is indicated by darkening of the copper (fig. 3). This reaction is also produced by antimony and bismuth. Mercury and silver give a grayish color.

Confirmatory tests for arsenic and mercury can be performed by heating the wire in a pyrex ignition tube, (10 x 125 mm.). Place the wire in the tube and apply heat where a darkened portion is in contact with the tube wall. Arsenic will resublime in the form of octahedral crystals in the cold part of the tube. Mercury will resublime in the form of droplets of mercury on the cold portion of the tube.[1] Antimony yields needle-shaped crystals on prolonged heating. Bismuth and silver do not resublime by this technic.

Strong positive tests for arsenic can often be detected by blackening of the copper in 15-20 minutes. Very strong positives may result in flaking off of the copper arsenide that forms on the copper wire or squares. This makes frequent observation of the reaction advisable.

Precautions

Symptoms of severe gastroenteritis and diarrhea that may occur with arsenic poisoning-like conditions might lead to the use of a bismuth preparation by someone treating affected animals. This would give a positive result to the Reinsch test which would be misleading unless the confirmatory sublimation test were used. Calomel will also give a positive result on prolonged boiling, and Smits and Barner[1] indicate that a positive Reinsch test for mercury does not necessarily mean it is present in toxic amounts.

Poisoning cases sometimes lead to law suits. Even a mediocre lawyer would not have much trouble convincing a jury that the average veterinarian is not qualified in chemistry. Where a lawsuit is a possibility, it might be wise if the practitioner would stress that his diagnosis is based on the history, symptoms, and autopsy lesions, using the Reinsch test only as a supplemental measure. In these cases, the owner would be well advised to have a commercial chemist confirm the veterinarian's diagnosis with the specimens available, (stomach contents, liver, urine, material observed to have been ingested).

[1]Smits, B. L., and Barner, R. D., Clinical Application of The Reinsch Test: A Rapid Preliminary Method for Identification of Arsenic. *Vet Med.*, 45:111 (Mar.), 1950.

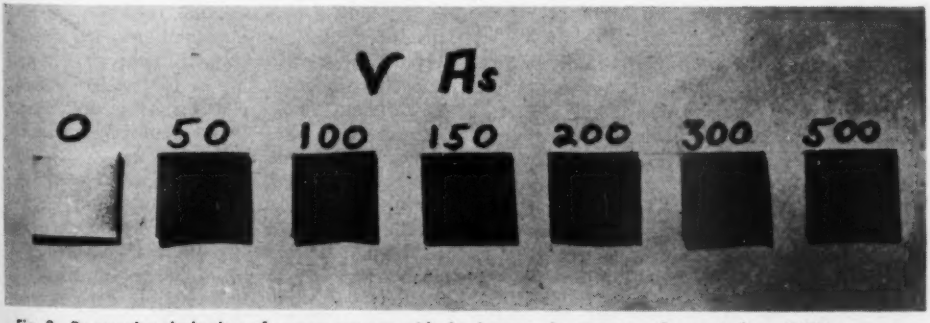

Fig. 3. Progressive darkening of cooper squares with the increase in gammas of arsenic from 0-500 gammas.

BOOK REVIEWS

Books reviewed in this department and any other books, if available, may be obtained by remitting the published price to the Book Department, Veterinary Medicine, Suite 803 Livestock Exchange Building, Kansas City 2, Missouri.

THE STATUS OF ANIMALS IN THE CHRISTIAN RELIGION *by C. W. Hume,* over 100 pages, illustrated. UFAW, London, publishers, 1957. Price—8 shillings, 6 pence, or about $1.50 plus postage.

Man's treatment of animals, whether intended for the laboratory or the dinner table, has always provided the veterinary profession with a perplexing problem. The wanton cruelty that attended the early history of the veterinary profession has been cited by Smithcors,* and some authors have found Christianity inimical to the humane treatment of animals. Although it is usually freely admitted that there is nothing in Christianity *per se* that is hostile to the humane treatment of animals, the teachings implanted on the shores of the Mediterranean were subject, from time to time, to interpretation. Why cruelty was rampant under the aegis of Christianity provides the content of this book with a revealing lesson in history.

In the Status of Animals, the author argues that it was Greek pride and deductive philosophy that enabled men to rationalize barbarism to animals. The author correctly points out the fact that man's inhumanity to man and animals alike reached the nadir of disgrace during the post-renaissance period, when the writings of the Ionian philosophers regained their dominance. He also notes that although St. Thomas Aquinas was unfavorable to the status of animals, there existed at the same time Franciscan monks whose keen observations and passion for investigational habits in reality paved the way for the scientific movement.

Readers who are not familiar with the terminology of philosophy will find this to be deliberate reading, albeit rewarding. Veterinarians interested in the history of their profession can not afford the luxury of ignoring this book. Readers well grounded in the ramifications of onthology, theodicy and the like will find The Status of Animals dazzling in its simplicity, lucid, concise, deliberate.

Although erudite and compact, The Status of Animals can be recommended to everyone in the profession.

* * *

THE INFECTIOUS DISEASES OF DOMESTIC ANIMALS, by *William A. Hogan, D.V.M., B.Sc.,* Professor of Bacteriology and Dean of the faculty, New York State Veterinary College, Cornell University, Ithaca, and *Dorsey W. Bruner, D.V.M., Ph.D.,* Professor of Bacteriology, New York State Veterinary College. 3rd. ed., 988 pages, 171 illustrations. Comstock Publishing Associates, Ithaca, N. Y., publishers.—Price $10.50.

The first edition of this book sold out five printings, attesting its popularity as a text book as well as a reference work.

Much of a second edition that appeared in 1950 was rewritten with the assistance of a junior author. It too found ready acceptance among students and practitioners.

New facts concerning infectious diseases uncovered since 1950 have prompted the current revision which includes two completely new chapters as well as extensions of all the old ones. All sections of the new text have been reviewed and few have escaped alteration and additions.

Infectious Diseases of Domestic Animals considers diseases caused by bacteria, protozoa, fungi, and viruses and the nature of disease processes attributable to their invasion of susceptible hosts. Its approach to the subject presupposes understanding of the reader of basic bacteriology and emphasizes action and results of specific diseases. This premise has been retained through the three editions, which fact has been, perhaps, largely responsible for the usefulness of the text for practitioners.

The authors are conscious of the necessity of keeping abreast of newer knowledge. A chapter on disease of unknown or uncertain etiology is also included, illustrating the attempt to provide up-to-date coverage of the subject.

*Smithcors, J. F., Evolution of the Veterinary Art, Veterinary Medicine Pub. Co., 1957.

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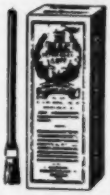

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Doctor Simms Accepts Assignment in Turkey

Dr. B. T. Simms, former chief of the BAI, USDA, has accepted an appointment with the University of Nebraska to serve as an exchange professor of veterinary science to the University of Ankara, Turkey.

Dr. B. T. Simms

In retiring from government service, Doctor Simms paved the way for further contributions to the advancement of understanding of livestock problems in foreign nations. His years of experience in the American nerve center of the livestock industry will be invaluable not only to the industry of Turkey, but to the public health of that nation as well.

Doctor Simms' long career of distinguished service has been recognized repeatedly. He was awarded the 12th International Veterinary Congress prize in 1955, and more recently the First Distinguished Service Research Award from the American Health Institute of Des Moines. In additional to services for which he has received these and other awards, Doctor Simms has made significant contributions to a number of international veterinary meetings. His voice in international veterinary affairs has provided the basis for a range of association with many of the profession's distinguished research scientists who represent almost every country in the world.

▼ ▼ ▼

According to information revealed in a study by the Gaines Dog Research Center, New York, 207 of the 942 veterinary students, who completed their first year of the professional curriculum at American schools this spring, already have been awarded Bachelor degrees and 11 hold Master of Science degrees.

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"We kept accurate records on the next 118 cases of dogs who were diagnosed clinically as distemper or distemper exposure cases. . . . All were given anti-distemper serum at 1½ cc. per lb. of body weight, plus Terramycin. Where gastritis or enteritis was a symptom, benzocaine plus cerium oxalate was dispensed. Owners were instructed to feed whatever the dog would eat, or force feed, and return in 48 hours for a check.

"One hundred and twelve were back to normal in 48 hours. Owners reported that the dog began to act better at the end of 24 [hours]. Multiple vitamins were dispensed until recuperated. None of these relapsed."

Vetter, R. F.: California Vet. 5:15 (Jan.-Feb.) 1952.

TERRAMYCIN INTRAVENOUS Vials of 250 mg., 500 mg., 1 Gm. and 2.5 Gm. with Water for Injection, U.S.P.

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SOLD TO VETERINARIANS ONLY

in canine distemper

the way it was

"While discussing canine distemper permit me to say that nothing new is being done in the way of treatment. We still believe that good nursing, warm, dry housing, and symptomatic treatment constitute rational therapy. For those mixed infected cases where the patient is having considerable difficulty in breathing, we often resort to medicated steaming or medicated drops . . . [which are] soothing to the membranes and promote clearing of the passages." Bower, C. W.: Cornell Vet. 26:37 (April) 1936.

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BRAND OF OXYTETRACYCLINE

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"From our first experience with Terramycin we decided that it would be a beneficial drug for the treatment of distemper. It had the ability to keep down the dangerous secondary invaders.

"We kept accurate records on the next 118 cases of dogs who were diagnosed clinically as distemper or distemper exposure cases. . . . All were given anti-distemper serum at 1½ cc. per lb. of body weight, plus Terramycin. Where gastritis or enteritis was a symptom, benzocaine plus cerium oxalate was dispensed. Owners were instructed to feed whatever the dog would eat, or force feed, and return in 48 hours for a check.

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CIBA Launches Promotion Campaign

A nationwide promotion campaign of veterinary products through 20 ethical veterinary distributors was launched July 1 by CIBA Pharmaceutical Products Inc., according to information released by Karl Osborn, assistant sales manager. Promotion of these products will also be carried out by means of direct mail and journal advertising and by the display of CIBA exhibits at major veterinary meetings. At the present time the company does not plan to organize a veterinary field sales force.

▼ ▼ ▼

Gaines Veterinary Symposium

The veterinary symposium on The Newer Knowledge About Dogs, sponsored annually by the Gaines Dog Research Center, New York, will feature a distinguished panel of leading researchers and scientists as speakers for its seventh consecutive program on Wednesday, Oct. 23rd, at the Kankakee, Ill., Civic Auditorium.

Dr. C. A. Brandly, dean of the University of Illinois College of Veterinary Medicine, will act as chairman of the program.

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Bol-Tabs

The preferred oral adjunct in plant poisonings.
The most convenient oral aid in intoxications of obscure alimentary origin, often accompanying milk fever, acetonemia and other morbid conditions (downers) in which there is reduced or impaired intestinal motility.
The toxopexic action of **ALKADOTE** acts to fix certain toxins and other harmful substances in the alimentary tract, rendering them harmless to the animal, until they can be removed by a laxative, such as **BOVIDOTE, PURGICIN** or **PERI-LAXIN.**
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Keep it ***MILKING***

INJURED TEATS, SCAB TEATS, STENOSIS, POST-OPERATIVELY

To maintain unrestricted milk flow and provide antiseptic protection is of first importance in the successful treatment of teat troubles. Dr. Naylor Dilators act both MEDICALLY and MECHANICALLY to provide broad spectrum germicidal activity and gentle, non-irritating support to traumatized sphincter and teat mucosa.
Contain Sulfathiazole — the self-contained anti-microbial medication in Dr. Naylor Dilators provides full time antiseptic activity in the entire streak canal. They do not depend upon packaging ointment for antiseptic or therapeutic properties. The medication is IN the Dilators and is released slowly IN the teat to combat infection, reduce inflammation and keep streak canal open to promote normal healing, natural milking. Positive retention in large or small teats!

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16 Dilators

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Here, at American Cyanamid, the veterinarians who comprise the staff of our Veterinary Professional Service Department find deep satisfaction in the knowledge that their efforts are devoted to the best interests of the entire profession.

As veterinarians, they have practical knowledge of the problems of the veterinarian—and this sincere understanding naturally results in a realistic and sympathetic approach to all the various phases of Cyanamid research and product development.

In all, 28 veterinarians are at work in the development of new and better products, which, in their belief, will provide their profession with ever more effective therapies for success and satisfaction in practice. For details write VETERINARY PROFESSIONAL SERVICE DEPARTMENT, AMERICAN CYANAMID COMPANY, N.Y. 20, N.Y.

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And, there are other traditionally good reasons why there is a preference for B-P RIB-BACK SURGICAL BLADES . . . they are *always* dependable and highly economical in performance.

Ask your dealer
BARD-PARKER COMPANY, INC.
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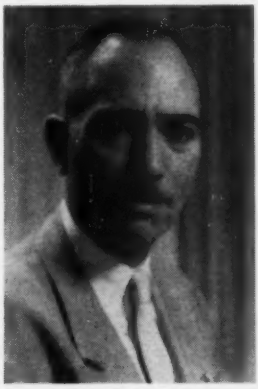
Wyeth Laboratories Names Drs. McCarty and Huebner to Veterinary Posts

Wyeth Laboratories announces the appointments of Dr. Robert T. McCarty as director of veterinary services and Dr. R. A. Huebner as head of the firm's scientific information service.

Dr. Robert T. McCarty

Doctor McCarty, Tex. '49, was a staff member of New Mexico A. & M. College Experiment Station at Las Cruces and a private practitioner at Alvarado, Texas prior to joining Wyeth Laboratories. He will direct the development of veterinary products and dissemination of product information to the veterinary profession.



Dr. R. A. Huebner

Doctor Huebner, UP '36 is a veteran of eight years in the Army and now holds a commission as colonel in the Veterinary Corps.

(Continued on page XLVII)

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Promazine Hydrochloride

OFFERS OUTSTANDING ADVANTAGES TO ANIMAL PRACTITIONERS

1 It calms animals—large and small—without the stupifying grogginess that masks symptoms and hinders diagnosis.

2 It *controls* animals without the need for mechanical restraints which so often strain veterinary-client relations. In effect, it substitutes *chemical restraint* for *physical force.*

The ability of SPARINE to reduce struggle and to make animals quiet and manageable makes it invaluable in

Physical Examinations
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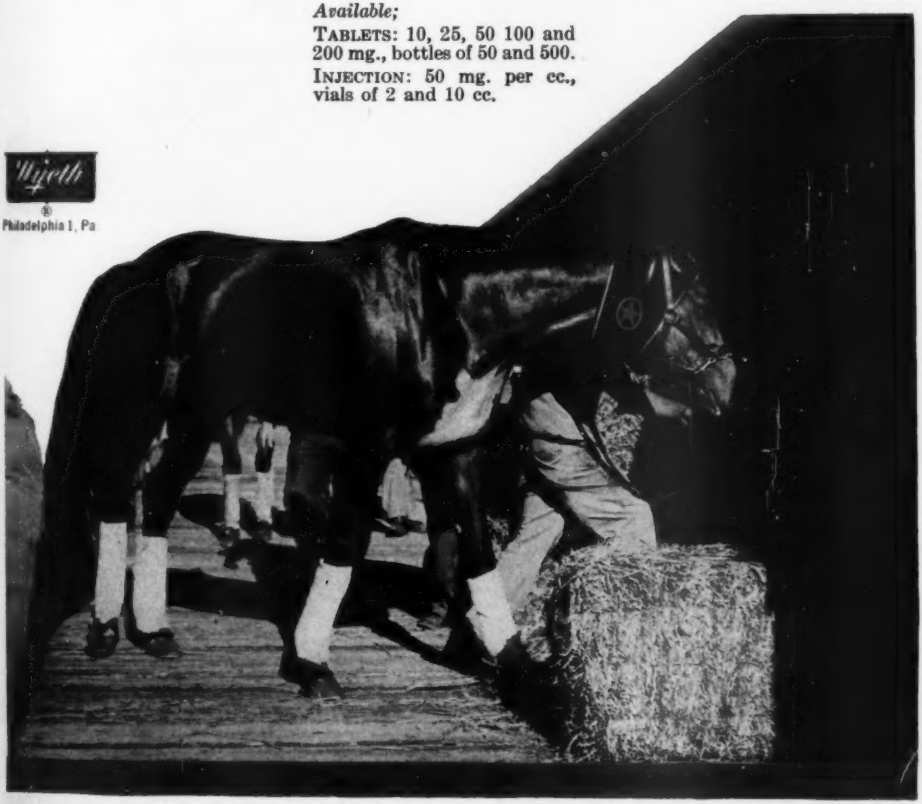
Available;
TABLETS: 10, 25, 50 100 and 200 mg., bottles of 50 and 500.
INJECTION: 50 mg. per cc., vials of 2 and 10 cc.



Wyeth
Philadelphia 1, Pa

Prevent relapses in milk fever with calcium-raising PARTEROL*

Parterol is an oil-soluble steroid that is specific for raising the blood calcium level following parturition. Parterol supplements the hormone secreted by the parathyroid glands, and thus helps to mobilize calcium stored in the bones and to increase the absorption of calcium from the intestinal tract.

One clinical study of 328 cases of milk fever treated showed that Parterol I.M. and calcium I.V. were effective in 98% of the cases.[1]

Indication and dosage:

To prevent relapses in milk fever by supplementing the parathyroid hormone during periods of stress on the calcium-regulating mechanisms due to increased demand for calcium at parturition. After treatment with calcium, Parterol should be given at the rate of 10 mg. per cow.

To prevent milk fever by regulating the calcium blood and tissue level at the critical calcium-utilization period at parturition. Parterol should be given 24 hours prior to parturition in a dosage of 10 mg.

Supplied: In 30 cc. sterile vials, each cc. containing 2.5 mg. dihydrotachysterol in oil.

1. Harris, J.R. and Clarkson, T.B., Prevention of Relapses in Milk Fever, Vet. Medicine, *12*:696 (Dec. 1955)

Write for literature

*Patent applied for

The S. E. MASSENGILL COMPANY · Veterinary Division · Bristol, Tennessee

(Continued from page XLIV)

Before joining Wyeth in 1949, he was director of the diagnostic laboratory for the Louisiana State Livestock Sanitary Board. Doctor Huebner is now president of the Keystone Veterinary Medical Association. In his new post he will be in charge of library services, translating and abstracting medical and scientific writings, editorial services, and technical files services.

▼ ▼ ▼

Doctor Adams to Teach and Study in Africa

Dr. O. R. Adams, Professor and Head of the Department of Veterinary Clinics and Surgery, Colorado State University, has been awarded a Fulbright scholarship to Kabete, Kenya, East Africa starting in July, 1957. Doctor Adams will aid a new veterinary school there in organizing their large animal and ambulatory clinics. He will also do some research in the virus diseases occurring in that area. This veterinary school educates African students in a six-year course which gives them a certificate, but not a degree, in veterinary medicine.

DEODORANT DAIRMOL ANTISEPTIC

FOR SKIN & ACCESSIBLE MUCOUS MEMBRANES OF ALL DOMESTIC ANIMALS

Also excellent for care of hands and instruments—
Non-caustic. Non-irritating.
Recommended for lubricating hands and arms; deodorizing and soothing qualities particularly desirable in removing retained placenta, etc.
Dairmol cleanses, retains cutting edge of instruments without corrosion.

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No . . . Not Magic . . . But 42 Years of Consistent Quality and Dependable Products That Make . . .
GRAIN BELT
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GRAIN BELT Anti-Hog cholera serum
GRAIN BELT and AFFILIATED Brands of High Merit
Employ the finest most modern methods of production in order to supply the Veterinarian with quality products and bring the livestock owner the protection he can depend on . . . Laboratory tested for Purity . . . Potency and Safety . . . rigidly tested and time proven Grain Belt and Affiliated products equal or surpass strict government standards.
AFFILIATED Quality Biologics Vaccines . . . Anti-Serums
Produced for the exclusive use of the Graduate Licensed Veterinarian
Member: Associated Veterinary Laboratories Inc.
GRAIN BELT SUPPLY COMPANY
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Dean Chester F. Clark
1889 - 1957

Dr. Chester F. Clark, dean of the College of Veterinary Medicine at Michigan State University, died July 28, 1957 a month before he was to retire as Dean Emeritus. Born Oct. 31, 1889, in Fitchburg, Mass., Doctor Clark received his D.V.M. at Michigan State in 1929. He previously attended Stockbridge (Mass.) School of Agriculture and the U. S. College of Veterinary Medicine.

Dean Chester F. Clark

Dean Clark's ill health, which forced his retirement after a quarter-century at Michigan State, already had led the State Board of Agriculture to name his successor. Dr. W. W. Armistead, dean of the School of Veterinary Medicine, at A. & M. College of Texas, will head the M.S.U. faculty effective Aug. 10.

While head of the Department of Surgery and Medicine at M.S.U., Doctor Clark was named dean in 1951 following the death of Dr. Claude S. Bryan. He directed planning and reorganization underlying the move into the new M.S.U. veterinary plant, then under construction.

Before his appointment to the top administrative post, Doctor Clark had spent more than 20 years working with Michigan veterinarians and farmers both as a member of the M.S.U. staff and for three years as state veterinarian. His research activities centered in the field of cattle diseases; many of his professional articles dealing with brucellosis in dairy cattle and with bovine reproduction.

He is survived by his wife, Mrs. Muriel Hoover Clark, and three children: Dr. John H. Clark, veterinary practitioner in the Detroit area, and Marjorie Elizabeth and Andrew A., both of the home.

NEW! for faster weight gain at lowest cost– in steers

more convenient! lower cost! effective!

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STIMPLANTS*

A NEW STILBESTROL IMPLANT

Pfizer's brand of stilbestrol pellets designed for administration by the Automatic Implant Gun—for *convenient, rapid,* and *low-cost* implanting of steers under *drylot* or *pasture* conditions.

Just *one* instrument, Pfizer's Automatic Implant Gun is all that is needed to implant the recommended 24 to 36 mg. dose of stilbestrol (two to three pellets). No nicking of the skin, no handling of extra instruments. A quick swab of the ear, easy insertion of the surgically sharpened needle under the skin, effortless pressure on the trigger and the animal is ready to be released. Special clips of pellets to allow treatment of three to five animals without reloading.

A time saver in practice . . . indispensable for dispensing!

STIMPLANTS: The recommended dose of 24 mg. (two pellets) for range animals and 36 mg. (three pellets) for feedlot cattle will stimulate:

- maximum daily weight gains with
- less feed consumption per unit gain at
- minimum cost.

STIMPLANTS Introductory Deal available from your Pfizer distributor: Clips of 10 pellets; each pellet contains 12 mg. of stilbestrol.

*Trademark

Department of Veterinary Medicine
PFIZER LABORATORIES, Brooklyn 6, N. Y.
Division, Chas. Pfizer & Co., Inc.

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*Thorazine**

(Chlorpromazine, S. K. F.)

FOR VETERINARY USE ONLY

on outstanding record of clinical achievement in both large and small animals

- induces a state of unique tranquility without clouding consciousness or depressing mental faculties[1]
- potentiates local anesthetics[2]
- enhances the activity of analgesics and sedatives[3]
- controls nausea and vomiting[4]

Now available to veterinarians in these dosage forms:

2 cc. ampules containing 50 mg. 'Thorazine' in boxes of 6:
Tablets, 10 mg., in bottles of 50;
Tablets, 25 mg., in bottles of 50 and 500

Pitman-Moore Company is sole distributor of 'Thorazine' to the veterinary profession.

References: 1. Martin, J. E., and Beck, J. D.: Am. J. V. Res. 17: 678, 1956. 2. Troughton, S. E., Gould, G. N. and Anderson, J. A.: Veterinary Record 67: 903, 1955. 3. Brodey, R. S. and Thordal-Christensen, A.: J.A.V.M.A. 129: 410, 1956. 4. Estrada, E., to be published.

*T. M. Reg. U. S. Pat. Off., Smith, Kline & French Laboratories, Philadelphia.

PITMAN-MOORE COMPANY
DIVISION OF ALLIED LABORATORIES, INC., INDIANAPOLIS 6, INDIANA

CLINICAL USAGE OF

Thorazine

Dog
- For Hysterical, Nervous or Unfriendly Patients
- As an Aid in Medical Treatment (Restraint)
- In Surgery
  - Pre-anesthetic Usage as Replacement for Morphine
  - In Combination with General Anesthetics
  - Used Alone for Anesthesia
- Anti-emetic Effect
  - Prior to Anthelmintic Treatment
  - For Vomiting from Gastritis
  - For Vomiting from Pyometra
  - For Vomiting from Other Causes
- For Heat Stroke
- In Shock Due to Trauma
- For Fracture Reduction
- For Cough
- For Painful Conditions
  - General
  - Prolapsed Spinal Disc
  - Rheumatic Type
  - For Pain Associated with Otitis, Ocular Lesions or Wounds
- Aid in Breeding
- In Convulsive Patients
- Anti-diarrheal Effect
- Aid in Oral Medication
- Aid in Controlling Severe Pruritus
- In Obstetrics
- In Chorea Patients

Cat
- For Frightened or Unfriendly Patients
- In Surgery
- Aid in Hairball Therapy
- Anti-emetic Effect

Horse
- For Sedation
- In Tetanus Cases
- In Colic Cases
- In Surgery

Cattle
- For Sedation
- In Surgery
- To Relax Penis of Bull

Swine — For Sedation

Goats — For Sedation

Sheep — For Sedation

'From Table of Contents of Pitman-Moore's' Thorazine', Laboratory and Clinical Reports. ***Write for your copy.***

How Anabolin™ Helps Regulate Metabolism

Anabolin is a balanced combination of three key hormones. Anabolin helps overcome endocrine imbalance in dogs that show depression, fatigue, lowered resistance, effect of stress and disease, or the slowdown of old age.

Hormones in metabolism – Nearly all metabolic functions depend upon, or are influenced by, the endocrine system. *Anabolism,* associated with growth and resistance to disease or other stresses, and *catabolism,* associated with loss of weight, lowered vigor and the undesirable effects of aging – both of these processes of metabolism are markedly affected by changes in endocrine balance.

The Anabolin rationale – Each Anabolin tablet contains a balanced combination of thyroid globulin (Proloid®), methyltestosterone and ethinyl estradiol. Thyroid globulin, the highly purified extract of thyroid, is a metabolic speed regulator influencing every cell in the body. The thyroid globulin in Anabolin helps overcome hypothyroidism manifested by such symptoms as sluggishness, obesity, poor hair quality, poor appetite. (Many older animals actually suffer from hypothyroidism, yet there may be no signs of thyroid deficiency.)

Thyroid globulin also triggers into action the combined anabolic effects of the androgen and estrogen in Anabolin. Ethinyl estradiol improves cell membrane permeability, influences all body tissues by helping transmit nutrients through the cell wall. Methyltestosterone plays an equally important role in protein metabolism. Absence or inadequacy of androgen is believed to be responsible for loss of protein from all cells, muscle, and bone in the aged animal.

The Anabolin formula – In Anabolin, the amounts and balanced proportion of thyroid globulin, methyltestosterone and ethinyl estradiol have been clinically selected so that only the desired anabolic effects are obtained. Anabolin contains Proloid (thyroid globulin) 16.0 mg. (¼ gr.), methyltestosterone 2.5 mg., and ethinyl estradiol 0.005 mg.

Clinical activity of Anabolin –

- *restores muscle tone, vigor, and sense of well-being*
- *permits better utilization of protein*
- *speeds recovery following infection, surgery, or injury*
- *improves appetite and alertness*
- *restores luster to the coat*

Use of Anabolin – Anabolin is supplied in bottles of 100 and 500 tablets. Tablets are small, are easily administered either directly by mouth or in food. The recommended daily dosage is 1 or 2 tablets. Beneficial results of Anabolin can usually be expected in 7 to 10 days after start of therapy.

Sold only through ethical veterinary distributors

Anabolin™

METABOLIC REGULATOR

DIVISION OF VETERINARY MEDICINE

WARNER-CHILCOTT *Laboratories*

MORRIS PLAINS, N. J.

Symposium on Anaplasmosis

Conference of Research workers on Anaplasmosis convened on the campus of the Kansas State College, Manhattan, June 12-13, 1957.

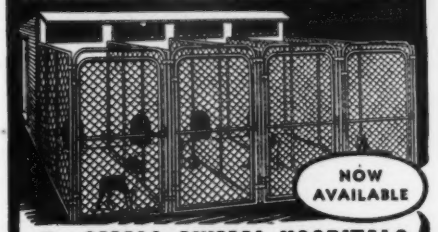
Since the second conference on the subject, five years ago, some progress has been made particularly in development of a fairly dependable method of identifying carriers—the complement-fixation technic. The annual losses from this costly disease have been variously estimated to be from $10,000,000. to $100,000,000.

Exact identification of the causative agent probably would lay the foundation for developing a vaccine or other positive means of preventing, even eradicating bovine anaplasmosis. This central problem is being attached at various research institutions with the newest tools of scientific research, including radioactive isotopes, fluorescent staining, the electron microscope, and artificial culture of *A. marginale*.

▾ ▾ ▾

Ornithosis is now being classified as an occupational disease of poultry plant workers.

MASON'S *New* KENNEL RUNS



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Quickly Erected - NO POSTS REQUIRED

Can be set on concrete or wood floors or directly upon the ground, joining to, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with BATES BUILT-IN and Lockable Latches.

FREE CATALOG

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THE MASON FENCE CO., Box 77, LEESBURG, OHIO

Pigs may harbor *Leptospira canicola* and human infection may result through contact, according to report by Coghlan *et al.* (*Brit. Med. Jour.*, 5013:257, 1957).

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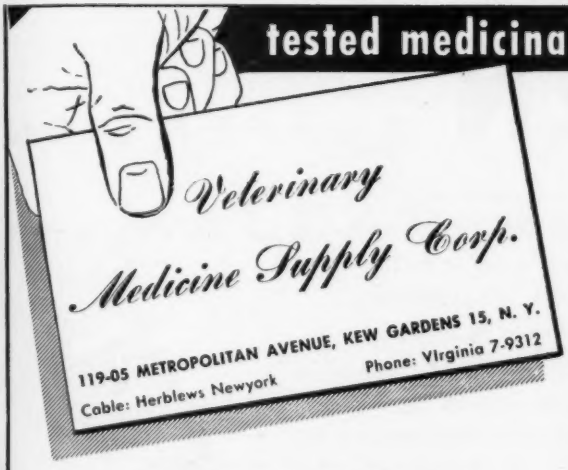

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1gm .19
5gm .68

Penicillin G. Procaine in Aqueous Suspension or oil
300,000 Units cc 10cc Vial 10 vials 4.30
100 vials 39.00

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Your inquiries are invited. Prices subject to change without notice.

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5gm 1% 1 tube .75
12 tubes 7.64
20gm 1% 1 tube 2.25
12 tubes 23.60
5gm 2.5% 1 tube 1.50
12 tubes 15.90
20gm 2.5% 1 tube 4.40
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Bacitracin Oint.
½ oz. 500 units per gram 1 tube .40
12 tubes 3.95
1 oz. 500 units per gram 1 tube .70
12 tubes 6.95

Pencillin Tab with Triple Sulfas
300,000 units with 0.5 gram Sulfas
100's 6.95

Dihydrostreptomycin Solution 200cc 6.25
each c.c. contains 250mg Dihydrostreptomycin

Procaine Hydrochloride Solution
2% 100cc Vial 1 Vial .60
10 Vials 5.50

Pen-Duostrep (Sharpe & Dohme)
for Aqueous Injection 4: ½
5 dose vial .68

Aqueous Suspension of Procaine,
Penicillin G. with Dihyrdrostreptomycin
5 dose vial .69

nationally known antibiotics, therapeutics, hormones, biologicals, vitamins and pharmaceuticals for all animals

in itching dermatoses and demodectic mange

Complete control of nonspecific dermatoses was achieved in 87% of cases . . . definite improvement developed in another 11% . . . and demodectic mange cases responded well in 100% of cases, during the extensive clinical trials* of

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Moreover, practicing veterinarians everywhere have been getting results like these in both dogs *and* cats ever since.

SELEEN eliminates the need for separate dips or baths. In simple, 10- to 15-minute treatments, this preparation

- *relieves itching* and scratching, often in the first treatment.
- *kills ectoparasites*, including fleas, lice and demodex mange mites.
- *cleanses skin* and haircoat, removes tissue debris.
- *improves appearance* of animals, gives haircoats a glossier look.

SELEEN lathers easily, rinses quickly, and leaves no greasy stains for carpets or furniture.

The Suspension is supplied in 6-fl.oz., pint and economical gallon bottles. Order from Veterinary Division, Abbott Laboratories, North Chicago, Illinois, your Abbott representative, or your distributor. Abbott

*Complete literature, with clinical data, available on request.

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708223

Laboratory Refresher Training Courses

The Communicable Disease Center of the Department of Health, Education, and Welfare, U. S. Public Health Service, has announced schedule of laboratory refresher training courses for the period through June 1958.

Information and application blanks may be secured from the Laboratory Branch, Communicable Disease Center, P.O. Box 185, Chamblee, Ga.

▼ ▼ ▼

The Senate debate on civil rights may force further postponement of a measure to assure public health. It is not unlikely that the Senate will carry over proposed compulsory poultry inspection legislation to the next session of Congress.

▼ ▼ ▼

Thyroprotein may stimulate some cows to produce more milk for a time, but it has little practical value in the average dairy herd. Sharp decline in production may also follow removal of the drug in some individuals.

DANGEROUS "DO-IT-YOURSELF" DIAGNOSIS

by farmers and pet owners has been discouraged for over 40 years by Vitamineral Products Company. VpC mineral, vitamin and antibiotic supplements are still sold *only* through veterinarians . . . and will continue to be, for your professional diagnosis and prescription are essential in the correction and prevention of nutritional deficiencies.

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PREVENT . . . . CONTROL

Digestive Stasis *with*

MAGDAD Stronger

BROAD BASE OF USEFULNESS — as an efficient antacid, carminative, demulcent, rumenatoric, laxative and purgative. MAGDAD Stronger may be used safely in domestic animals — large or small.

MORE EFFECTIVE THROUGH SYNERGETIC ACTIVITY — of Magnesium Oxide, 1-8 Dihydroxyanthraquinone and Diacetyldihydroxyphenylisatin — non-toxic, non-irritating digestive tract stimulants — together with Sodium Lauryl Sulfate — a wetting agent which reduces surface and interfacial tension between liquids, gases and solids.

EASY TO USE — MAGDAD Stronger, the free flowing, wettable powder may be given with feed, as a drench, with stomach tube or may be injected through the rumen wall.

Available in 240 gram jars or 25 pound drums

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no side effects from THERAPOGEN

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MEETING CALENDAR

American Veterinary Medical Association. Annual meeting. Cleveland Auditorium, Cleveland, Ohio, Aug. 19-22, 1957. Dr. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Washington State Veterinary Medical Association. Forty-second Annual Convention. Monticello Hotel, Longview, Wash., Sept. 9-10, 1957. Dr. William F. Harris, 1102 E. Main Street, Puyallup, Wash., secretary.

New Mexico Veterinary Medical Association. Annual Meeting. Hilton Hotel, Albuquerque, Sept. 9-10, 1957. E. R. Leslie, 413 S. Walnut, Carlsbad, New Mexico, secretary-treasurer.

New York State Veterinary Medical Society. Annual Meeting. Hotel Statler, Buffalo, N. Y., Sept. 11-13, 1957. Joan S. Halat, 803 Varick St., Utica, N. Y., secretary.

University of Georgia. Thirteenth Annual Short Course for Veterinarians. Department of Animal Diseases, Tifton, Ga., Sept. 16-17, 1957. Dr. Maurice W. Hale, Department of Animal Diseases.

South Dakota Veterinary Medical Association. Annual Meeting. Hotel Cataract, Sioux Falls, Sept. 19-20, 1957. Dr. J. L. Noordsy, Marion, S. Dak., secretary.

New England Veterinary Medical Association. Twenty-third Annual Meeting. Equinox House, Manchester, Vermont, Oct. 6-9, 1957. Dr. C. Lawrence Blakely, 180 Longwood Ave., Boston, Mass., secretary.

Purdue University. Forty-fifth Annual Short Course for Veterinarians. Agricultural Experiment Station, Lafayette, Ind., Oct. 9-11, 1957. Dr. L. M. Hutchings, Purdue University, Lafayette, Ind., chief veterinarian.

Florida State Veterinary Medical Association. Annual Meeting. Fort Harrison Hotel, Clearwater, Fla., Oct. 13-15, 1957. Dr. Robert P. Knowles, 2101 N. W. 25th Ave., Miami 42, Fla., secretary.

University of Missouri. Thirty-third Annual Short Course for graduate veterinarians. Columbia, Mo., Oct. 14-15, 1957. Dr. Cecil Elder, chairman.

Illinois Conference and Extension Short Course for Veterinarians. University of Illinois, College of Veterinary Medicine, Oct. 17-18, 1957. Dr. L. E. Boley, University of Illinois, chairman.

Eastern Iowa Veterinary Association. Forty-fourth Annual Meeting. Hotel Sheraton-Montrose, Cedar Rapids, Iowa, Oct. 17-18, 1957. Dr. F. E. Brutsman, Graer, Iowa, secretary.

Southern Veterinary Medical Association. Annual Meeting. Roanoke Hotel, Roanoke, Va., Oct. 27-30, 1957. Dr. A. A. Husman, P. O. Box 91, Raleigh, N. C., secretary.

Omega Tau Sigma Annual International Convention. Alpha Chapter, School of Veterinary Medicine, University of Pennsylvania, Nov. 7-9, 1957. B. Joseph Tribolla, Oak Avenue, R.F.D. #2, Hilltop, New Jersey.

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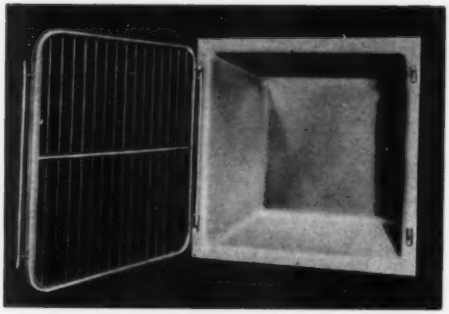

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Clarkson Addis, Collegeville, Pa., UP '17, Mar. 16, 1957.

Sanford T. Bodendistel, Guelph, Ont., ONT '30, Feb. 9, 1957.

Charles Coliton, Belleville, Ont., ONT '13, Dec. 15, 1956.

Robert W. Culbert, Fort Dodge, Ia., MCK '08, Mar. 24, 1957.

Paul N. Darlington, Chanute, Kans., KCV '15, Jan. 30, 1957.

Alvin H. Dowdy, Duncan, Okla., OKL '51, Apr. 3, 1957.

H. M. Garrett, St. Charles, Ia., KCV '14, Apr. 2, 1957.

Walter Grass, Dresden, Ont., ONT '08, Aug. 28, 1956.

Albert R. Greenwood, Los Banos, Calif., COR '50, Feb. 4, 1957.

Roy A. Groshong, Selma, Calif., KVC '18, Mar. 4, 1957.

O. W. Holman, Frankford, Mo., STJ '14, Mar. 18, 1957.

Edgar L. Houck, Winnipeg, Man., MCK '13, Feb. 2, 1957.

Charles E. Hutt, Hatfield, Pa., UP '28, Feb. 16, 1957.

Edwin P. Johnson, Roanoke, Va., MSU '25, Mar. 21, 1957.

Robert Benjamin Jones, Wadesboro, N. C., KCV '13, May 26, 1957.

Fred J. Lambeck, Kalamazoo, Mich., GR '12, Mar. 26, 1957.

Arnold F. Lees, Red Wing, Minn., ONT '89, 1957.

Fred J. Leith, Chicago, Ill., MCK '98, May 19, 1957.

INDEX TO ADVERTISERS
In This Issue of Veterinary Medicine

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Abbott Laboratories ..... XXXII-LIV
Affiliated Laboratories XXVII
Armour Veterinary Laboratories XXXIV
Arnold Laboratories LV

Babson Brothers Co. VI
Bard-Parker Co., Inc. XLIV

Carter-Luff Chemical Co. XXXVI
Coast Fisheries XXVI
Colwell Publishing Co. XLVII
Corn States Laboratories ..... Fourth Cover
Curtis Laboratories XLI

Dalare Associates XLVII
Diamond Laboratories XX

Eaton Laboratories ..... XIV-XXVIII-XXIX

Fine Chemical Division, American Cyanamid Co. ..... XLII-XLIII
Fort Dodge Laboratories IV
Fromm Laboratories XXXIII

Grain Belt Supply Co. XLVIII

Haver-Lockhart Laboratories XII
Hill Packing Co. V

International Salt Co. XIX

Jensen-Salsbery Laboratories ..... Second Cover

Kirschner Mfg. Co. LVIII

Mason Fence Co. LIII
Massengill Company XLVI
Meyer, Theo., Estate LVI

Naylor, H. W., Co. XLI
Norden Laboratories LX
Nutritional Minerals, Inc. XXXVII

Ocurol-Vet Co. LVI
Oster, John, Mfg. Co. XXXVI

Parke, Davis & Co. III
Parlam Corp. XXXVIII
Pedrick Laboratories XLVII
Pfizer, Chas. & Co. ..... XV-XL-XLIX-LIX
Pitman-Moore Co. ..... XXX-L-LI
Purina Mills IX

Research Laboratories LVII

Schering Corp. ..... XXI-XXII-XXIII-XXIV
Squibb, E. R. & Sons ..... X-XI
Sterling Research Corp. XXXVII

Upjohn Company, The XXV

Veterinary Diagnostic Laboratories XXXVII
Veterinary Medicine Supply Co. LIII
Vitamineral Products Co. LV

Warner-Chilcott Laboratories ..... XVI-XVII-XVIII-XXXIX-LII
Winthrop Laboratories, Inc. ..... Third Cover
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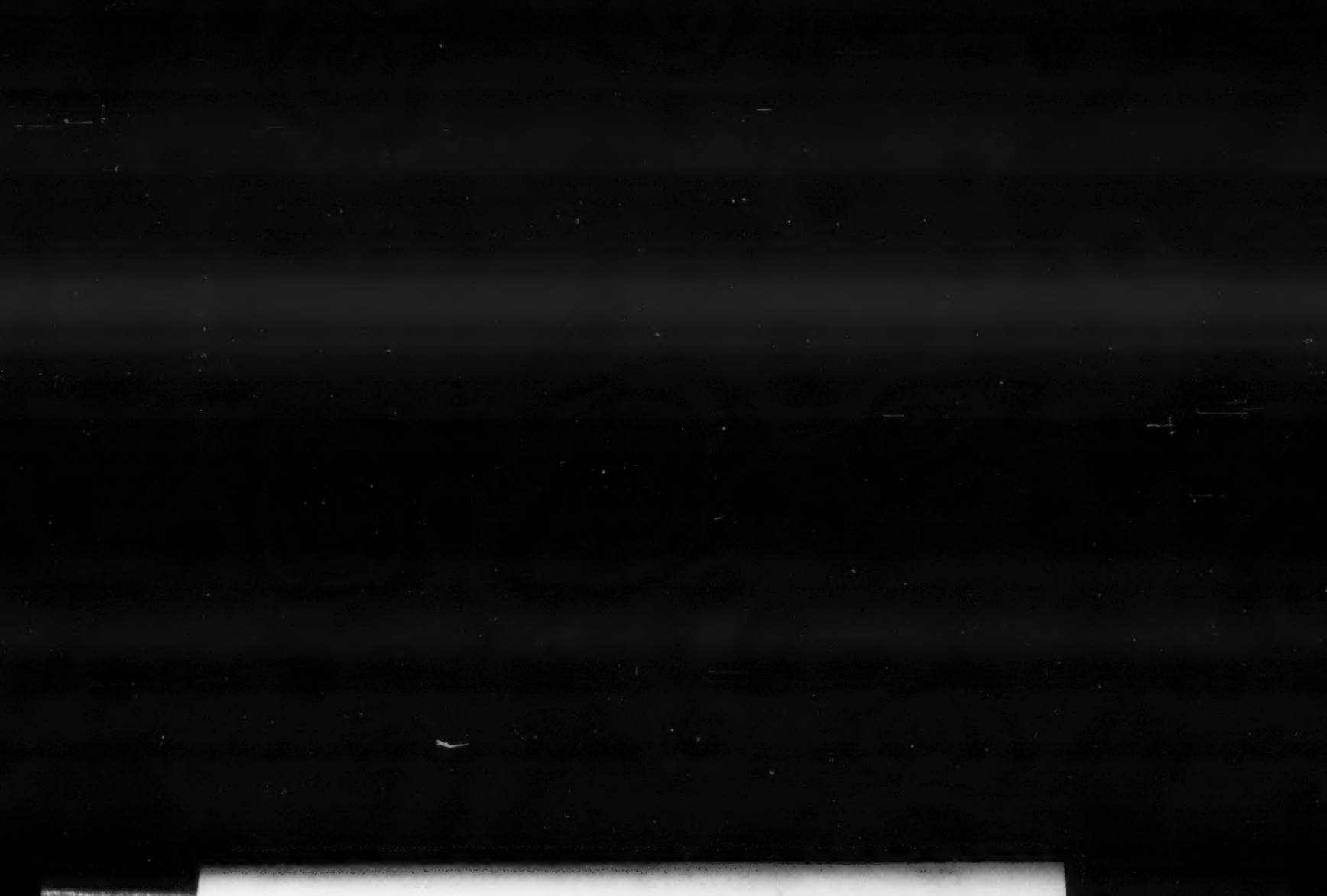

10